

APRIL 1955

# chemical processing

For Men Who Manage

- Streamlining a monomer-polymer separation 10
- Fast evaporation concentrates delicate product 16
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Putman Publishing Company

CREATORS OF *Putman-Style* MAGAZINES

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## CHEMICAL MATERIALS

FEATURE SECTION  
With Descriptive Listing  
of New Products  
Starts on Page 29



Acrylonitrile and Derivatives  
A Keynote for Materials Feature Section  
Story Begins on Page 48

# Look Into B&A CALCIUM ACETATE

POWDER, PURIFIED

## Typical Analysis:

Assay ( $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot \text{H}_2\text{O}$ )...	99.5 %
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When inquiring check CP 6036 opposite last page

THAT'S  
INTERESTING



"Down to my last pair of nylons."

## They're going to the post — in nylons

It may not be long before the fast fillies at the turf citadels of the country are running around in nylons — nylon horse-shoes, that is. Yes, du Pont's Zytel nylon resin has been put to that use. It conjures up such old saws as: "We like to see runs in these nylons" or "For 'sheer' speed, they can't be beat." Be that as it may, the developers of this equine footwear say it steps up a horse's speed by 4/5 of a second, or gives the lucky wearer a length and a half over steel shoes, half a length over aluminum shoes. The light (one ounce each) shoes also give better balance and more comfort to dobbie. All this seemed to be proved last summer at the Fair Grounds in New Orleans when an oft-beaten nag switched to nylons and romped home ahead in the fine time of 1:13 1-5 — paying \$36.20.

## Five-billion-year-old rain

Tests by scientists of Argonne National Laboratory and University of Chicago indicate that meteorites that bombard the earth were formed almost five billion years ago. Meteorite samples were dated by measuring the ratios of atoms of radioactive potassium 40 to atoms of the inert gas, argon 40, a process which involved analyzing the rate of decay of potassium 40.

## Foiling stiff paint brushes

To keep paint brushes in shape, this maintenance memo is suggested: after the brush has been cleaned, form an aluminum foil cone around it and drop it in some thinner. Then twist the foil closed around the handle, and the brush is OK for storage. (Kaiser Aluminum News)

(Continued on page 247)

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APRIL



# chemical processing

(CHEMICAL PROCESSING PREVIEW)

*for men who manage*

Vol. 18

April, 1955

No. 4

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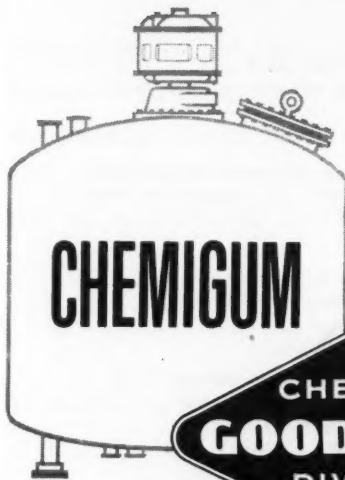
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## Now—roll-away service stations



RUBBERIZED fabric tanks that hold up to 10,000 gallons, yet roll into portable packages when empty, are the latest means of storing bulk fuels in the field. Twin problem in building these "pillow" tanks was finding a workable rubber that could withstand a variety of fuels and field conditions.

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In use, CHEMIGUM imparts high resistance to all fuels, plus excellent flexibility and low porosity in any weather. What can CHEMIGUM—calendered, molded, extruded or in solution—do for your product? Full technical help and samples are yours by writing:

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When inquiring check CP 6037 opposite last page

APRIL, 1955

Over  
the editor's  
shoulder



**New Chemical Materials —  
Over 500 of 'em!**

A complete listing of chemical materials introduced during 1954 appears in this month's featured Materials section (starting on page 29). Besides describing each item, we have indexed them by their uses. This spares you from wading through the list every time you're interested in pinpointing a material for a specific application.

To gather this information, we surveyed over 400 companies, asking them what was new in their line of materials for the chemical processing industries.

We asked them to tell us not only of formulating ingredients — like plasticizers, dyestuffs, paint vehicles, and other materials used directly to make a finished or semi-finished product — but also related products such as industrial adhesives, catalysts, ion exchange resins, analytical reagents.

Then, too, there's the "intermediates." Insofar as possible, we've designated their end uses by italics in the Use-Index (page 80).

Look to see if there's something you can use in your process — the section starts on page 29.

*Frank E. McElroy*


ASSISTANT EDITOR

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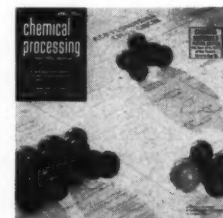
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THIS  
MONTH'S  
COVER

... depicts symbolically the road to acrylonitrile derivatives (see page 48).

The picture typifies the ever-increasing number of useful chemical building blocks available today. Over 500 of those introduced during 1954 are listed and indexed in this month's Materials Section.

(Molecular models were constructed from Fisher-Hirschfelder-Taylor Atom Model sets made and distributed by the Fisher Scientific Co.)



Association and Society addresses appear on page 200

April 4-5. Joint meeting of Atomic Industrial Forum and Stanford Research Institute, Mark Hopkins Hotel, San Francisco, California.

April 6-10. World Plastics Fair and Trade Exposition, National Guard Armory, Los Angeles, California.

April 13-15. Conference on Biological Waste Treatment, Manhattan College, New York City.

April 14-15. Joint Forum of The Clinical Institute of Canada and National Research Council, St. Catharines, Ontario.

April 17-20. American Oil Chemists' Society, 46th Annual Meeting, Roosevelt Hotel, New Orleans, Louisiana.

April 18-20. Third National Air Pollution Symposium, Huntington-Sheraton Hotel, Pasadena, Calif.

April 18-21. American Management Association, 24th National Packaging Conference and Exposition, International Amphitheatre, Chicago, Illinois.

May 1-4. American Institute of Chemical Engineers, Shamrock Hotel, Houston, Texas.

May 10. American Institute of Chemical Engineers, New Jersey Section, Sixth Annual Symposium, Hotel Essex, Newark, N. J.

May 16-20. National Materials Handling Exposition, International Amphitheatre, Chicago, Illinois.

May 18-19. Chemical Market Research Association, Annual Meeting, Plaza Hotel, New York City.

May 22-26. Air Pollution Control Association, Annual Meeting, Detroit, Michigan.

May 23-27. American Society for Testing Materials, Third Annual Conference on Mass Spectrometry, Mark Hopkins Hotel, San Francisco, California.

Sept. 12-16. Instrument Society of America, 10th Annual Instrument Conference and Exhibit, Shrine Exposition Hall and Auditorium, Los Angeles, California.

Postponement. First Design Engineering Show (formerly Basic Materials Exposition), scheduled for May 31-June 3 postponed until spring of 1956.

#### SPECIAL SERVICES FOR READERS

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- The product directory, pages 237 to 240, is your guide to all articles and advertisements
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## A highly reactive chemical intermediate



*Jefferson* ETHYLENE OXIDE

Produced by specialists in "essential chemicals from hydrocarbon sources."

Made to traditional high standards of quality, Jefferson's Ethylene Oxide is used as a starting material in the manufacture of acrylonitrile and nonionic surface active agents, and as a sterilizing agent and fumigant.

It is in general a very reactive chemical intermediate.

Available immediately in 4,000 and 10,000-gal. tank cars and 400-lb. net (ICC 5 P) drums. Samples for your preliminary investigation.

*Jefferson*  
CHEMICAL COMPANY, INC.  
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Wants a Product  
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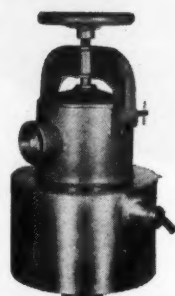
GRAVITY FERROFILTER

## Magnetic Separators

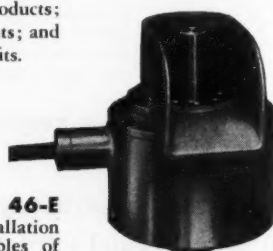
You can imagine (or maybe you know from personal experience) how iron contamination affects dye-stuffs, for instance, or foods or drug products.

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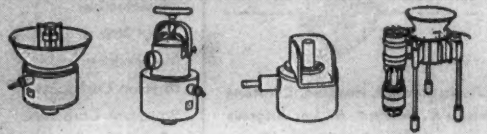
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### MAGNETIC SEPARATORS FOR THE PROCESS INDUSTRIES



GRAVITY PIPELINE UNDERFEED DRY, VIBRATOR

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## CHEMICAL PROGRESS WEEK MAY 16-21

**FRED J. EMMERICH**

Chairman of the Board  
Manufacturing Chemists' Association, Inc.

*Mr. Emmerich is an alumnus of New York University where he attended the School of Commerce, Accounts, and Finance. After completing military service in World War I, he joined the National Aniline & Chemical Co. as an accountant in 1920. National Aniline became a unit of Allied Chemical & Dye Corp. that same year.*

*Appointed comptroller of Allied Chemical in 1929 and subsequently vice president, Mr. Emmerich was elected president of the company in 1946, the position he holds today.*

*In 1952, Mr. Emmerich was awarded the Gold Medal of the American Institute of Chemists, in recognition of his achievements "as a business leader devoted to building the chemical industry by fostering cooperation among men skilled in chemistry, engineering and commerce."*



Again next month, the chemical industry has the opportunity to explain its job in relation to the daily life of the American people. Here's what was done last year, and it may give you some ideas on how to —

*tell your story during  
chemical progress week*

Just as each of us has our own individual personality by which people know and evaluate us, so do corporations and even industries. Because of the complex and diversified nature of our work, the "personality" of the chemical industry is hard to project — it is even more difficult for the average person to discover because much of what the chemical industry makes never reaches the consumer as a finished product by itself. The average man or woman may have an impression that chemicals are used in the defense effort and in health measures, but probably does not fully realize that they are indispensable in modern economic life.

The day when an industry could remain silent and limit itself to the making and selling of goods has

passed. The interrelationships which exist today no longer permit such a course. We are industrial citizens of our plant communities—in many cases substantial ones—and it behooves us to accept the present day conceptions of the responsibilities of citizenship.

We can best participate by taking advantage of every means of communication available to us. Although that is a year round job, it was highlighted in the chemical industry last year by the first "Chemical Progress Week." This pioneering venture in 1954 produced results that were gratifying and far exceeded the original goals and expectations.

When the count was in, it showed that industry representatives gave over 1000 speeches during

Chemical Progress Week to an audience of 115,000. A total of 261 plant-community advertisements appeared in newspapers having a combined circulation of 7 million.

Hundreds of plant tours were held where the public could see what went on in a chemical plant—hundreds of thousands of leaflets and posters were distributed—representatives of the industry appeared on nearly 750 radio and television programs—some 1500 newspaper stories and magazine articles were printed.

Twenty-one states and hundreds of cities and towns considered that the chemical plants in their communities had sufficient importance to merit official proclamation of "Chemical Progress Week."

One of the most encouraging features of the week was that men and women of the chemical industry from coast to coast and in communities both large and small picked up the idea and translated words into actions. Industry people in every branch gave generously of their time and energies in order to assure a successful program in their communities.

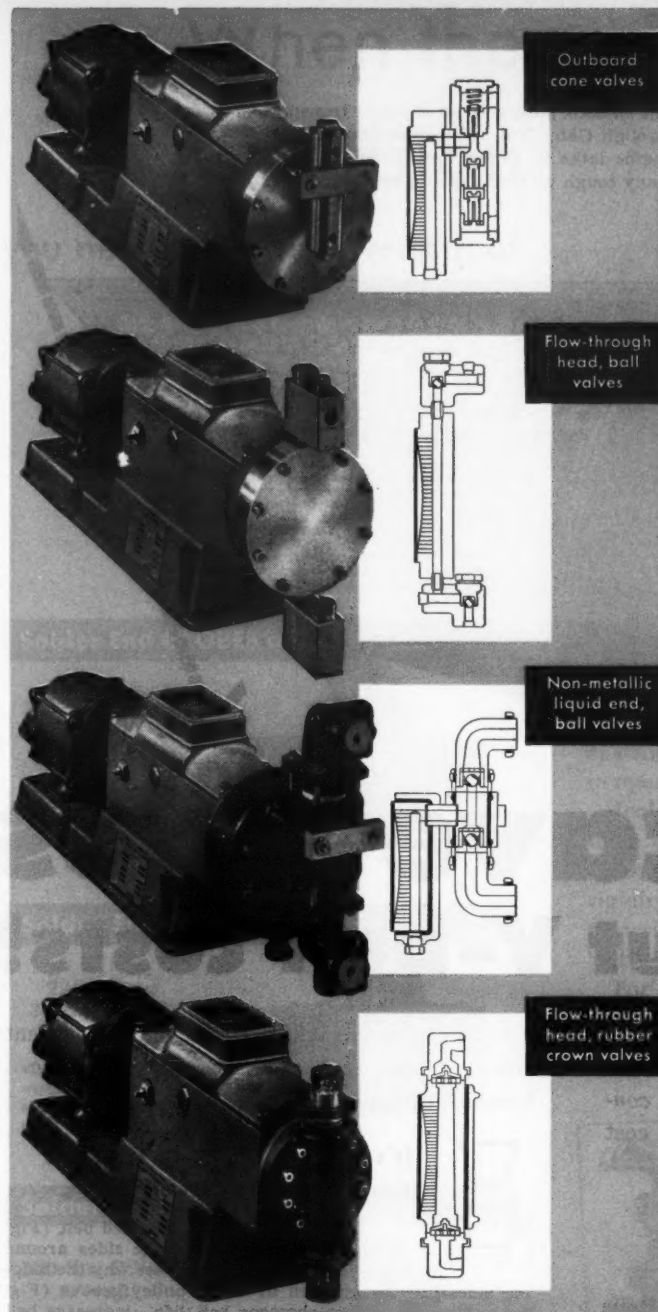
Heartened by the success of the first effort, the board of directors of the Manufacturing Chemists' Association unanimously approved a "Chemical Progress Week" for 1955. It has been scheduled for the week of May 16-21 inclusive. Considerable organization work has been done and CPW committees are being formed all over the country. The theme is the same — to explain to the American people what the chemical industry means to them in terms of their daily life.

Every company which considers itself a part of the chemical industry is invited to join in "Chemical Progress Week."



#### Proof of Progress . . .

is documented in the featured Chemical Materials section this month. More than 500 chemicals introduced in 1954 are listed there. All are available in commercial or experimental quantities. And to aid your progress in finding the chemicals you want, an index of their uses has been included. The section starts on page 29.



#### POSITIVE DISPLACEMENT...AND NO STUFFING BOX!

Lapp Pulsafeeder is the combination piston-diaphragm pump for controlled-volume pumping of fluids. Reciprocating piston action provides positive displacement. But the piston pumps only an hydraulic medium, working against a diaphragm. A floating, balanced partition, the diaphragm isolates chemical being pumped from working pump parts—eliminates need for stuffing box or running seal. Pumping speed is constant; variable flow results from variation in piston-stroke length—controlled by hand-wheel, or, in Auto-Pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable.

# 4 VALVE CONSTRUCTIONS

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## Lapp PULSAFEEDER

PISTON-DIAPHRAGM CONTROLLED-VOLUME CHEMICAL PUMPS

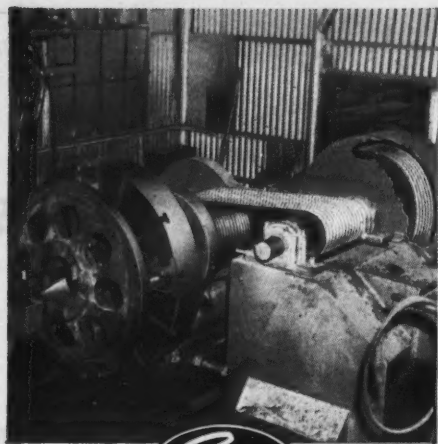
No one valve design or construction is adequate to handle all types of materials which must be pumped in controlled volume. Experience indicates that flow characteristics of fluids are greatly influenced by viscosity, specific gravity, lubricity and temperature; solids in suspension require a special design, whereas low-viscosity, non-lubricating liquids present a wholly different valving problem. Lapp offers the Pulsafeeder in a variety of liquid-end designs, materials of construction, and valve assemblies—four of which are shown here. For your "special problem" in proportioned pumping of liquids, ask us for an engineering recommendation on the Pulsafeeder assembly specifically suited.

WRITE FOR BULLETIN 440 with typical applications, flow charts, description and specifications of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Div. 365 Wilson St., Le Roy, N. Y.

# Lapp

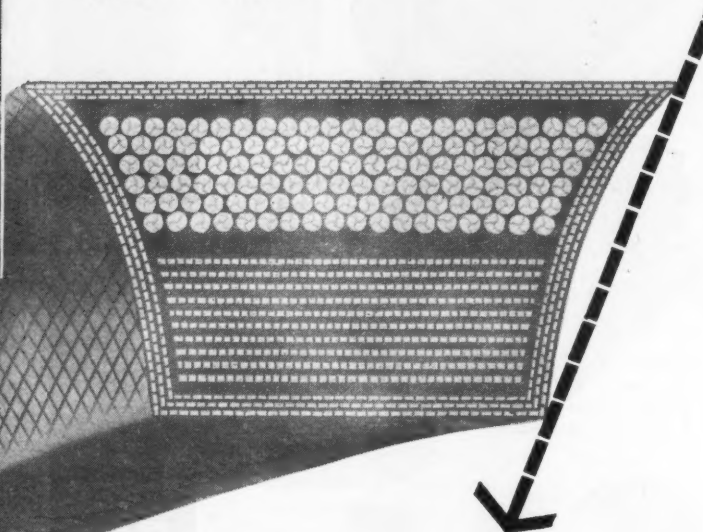
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The smooth, positive flow of power transmitted through Gates Vulco Ropes enables this large engine lathe to handle quickly and efficiently many tough oil field repair jobs.

**Gates**



## How Concave sides cut V-belt costs!



Fig. 1

Plants all over the world have made this discovery: Gates Vulco Ropes—the V-belts with *concave sides*—wear longer; cost less per year of service.



Fig. 1-A

**Here is the interesting reason why:**

When the Gates Vulco Rope is bent around the sheave, the *precisely engineered* concave sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes full, uniform contact with the sides of the pulley. You get sure pulling power and *even distribution of wear*.



Fig. 2

**It's easy to prove to yourself the value of concave sides**



Fig. 2-A

Simply bend a straight-sided belt (Fig. 2) and *feel* the bulge at the sides around the bend. You will quickly see why the bulging sides prevent an even fit in the pulley groove (Fig. 2-A). Uneven contact shortens belt life...increases belt costs.

Cut belt replacement time and costs...specify Gates Vulco Ropes—the V-Belt with *concave sides* (U.S. Pat. 1813698). The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts*.

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA-30-A-G

# GATES VULCO ROPE DRIVES

When inquiring check CP 6041 opposite last page

*what you can expect in next month's issue...*

**Pure petrochemicals—  
Udex process pays  
at Sun Oil**



Efficiency, economy, low maintenance — and most important, high purity — are outstanding advantages obtained by Udex extraction at Sun Oil Co's new petrochemicals plant, Marcus Hook, Pa.

Next month's cover story (a view of the Marcus Hook plant is shown above) gives details of Universal Oil Products' Udex process — a solvent method producing high-purity benzene, toluene, and xylene.

This on-the-spot report opens the "New Solutions" section for May.

**Tough corrosive atmosphere licked  
with rubber-base enamel**

Next month's feature article on corrosion problems and solutions tells how the Deepwater Chemical Co. of Compton, Calif., handled an atmosphere of iodine and sulfuric acid fumes, chlorine vapors, and moisture with a rubber-base enamel.

Plant superintendent Edgar B. Witmer and Assistant Editor Roy Helsing give details of the coating's protection of equipment and interior wall decoration.

**Impurities  
in color film  
spotted by analysis**



An analysis method to assure absence of impurities in color film, now used at the Eastman Kodak Co., is finding wide interest in the medical field.

An infrared spectrometer, a hydraulic press, and a beam condensing unit are used to analyze solids samples as small as twenty-five millionths of a gram.

The story, appearing in the Ideas section, was developed by Kodak's Dr. Don H. Anderson and Associate Editor Gordon Weyermuller.



Here's a quick preview  
of features you'll find  
in the May Chemical Processing



D-3, milk's "muscle",  
produced economically—  
recovery service helps

Vitamins, Inc. tells how it uses Pittsburgh Coke & Chemical's pyridine recovery service to reduce production costs in making vitamin D-3 from 7-dehydrocholesterol. Story, heading up the Materials section for May, reports up to 50% saving possible depending upon use of this solvent service.

#### "Kid-glove" handling of make-up catalyst

Make-up catalyst comes in pellet form at Texas City Refining, Inc. Used in the world's largest Houdriflow unit, these pellets have to be handled with kid glove care. How Texas City Refining and Kaiser Engineering solved the problem of unloading catalyst without breakage — in a hurry — is told in a Material Handling highlight by Texas City's Technical Director, D. E. Fuller, and Richard J. Callahan, Assistant Editor.

#### And in Brief . . .

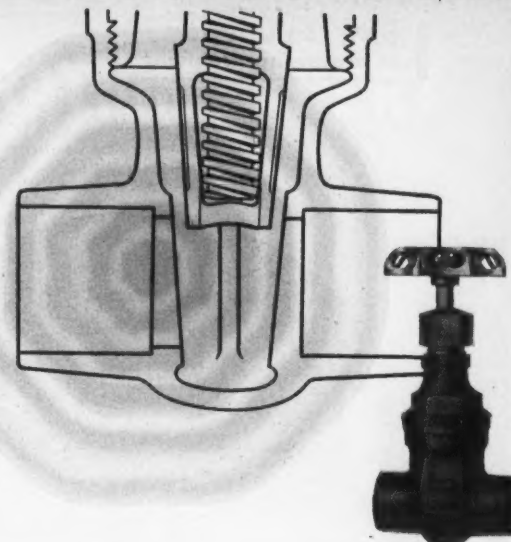
Shell's Epon resins plus some design magic by Wetmore Hodges Associates for the compact (75% smaller than conventional) motor-compressor are featured in next month's section on Engineering and Maintenance . . . "Guest" editor for May is Dr. Otto Eisenschiml — speaker, author, and Chairman of the Board of the Scientific Oil Compounding Co. of Chicago. In his thought-provoking article, Dr. Eisenschiml asks, "Must Chemists Remain Anonymous?"

. . . In line with new ideas, Motorola, Inc. describes how two-way radio system for vehicles at Trubek Labs, East Rutherford, N. J., has helped solve material handling problems. System can pin point location of trucks anywhere in plant area.

. . . all of our regular sections carry up-to-date, informative articles covering every field of chemical processing.



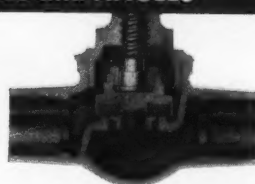
## When the heat's on you need the extra strength of JENKINS Solder and Socket End VALVES



### Solder End GLOBES and ANGLES

300 lbs. O.W.G.  
1/4" to 3"

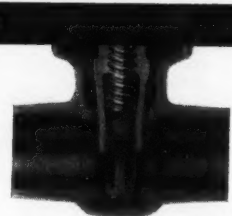
Fitted with Renewable  
Composition Disc.



### Solder End GATES

225 lb. and  
300 lb. O.W.G.  
3/8" to 3"

With solid or split  
wedges, and station-  
ary or traveling  
spindles.



### Solder End CHECKS

300 lbs. O.W.G.  
1/4" to 3"

Regrinding. May be  
easily reground with-  
out removal from line.



**NEW BULLETIN** Lists all Jenkins Solder End and Socket End Valves and gives complete instructions for soldering and brazing. Ask for Solder-Socket End booklet.

The "light-duty" look of copper tubing installations is deceiving. Valves must provide an accurate fit to tubing and *hold it* under the intense heat of soldering. And, because flexible tubing does not afford the rigid support of standard pipe, valves must withstand unusual strains in operation.

Jenkins Solder End Valves are engineered to meet these demands with strength to spare. High tensile bronze castings have liberal dimensions for extra rigidity. Smooth, clean bores assure accurate fit, easy soldering, positive seal to types K, L, and M Copper Tubing.

For faster, trouble-free installation, and lasting economy, specify Jenkins Solder End Valves. Jenkins Bros., 100 Park Ave., New York 17.

### JENKINS Socket End Valves for Class B or IPS Tubing



Jenkins bronze valves with socket ends for silver-brazing are made in Globe, Gate, and Swing Check patterns to control compressed air, hot oil, and similar fluids in tubing hookups where specifications call for permanent, leakproof joints. Complete information in the Bulletin offered below.

# JENKINS

LOOK FOR THE JENKINS DIAMOND

# VALVES



Jenkins Bros.

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS

When inquiring check CP 6042 opposite last page

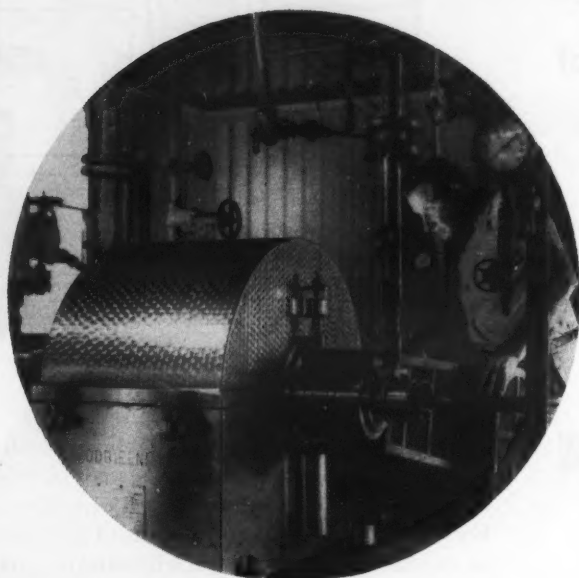


Fig 1—Compact machine measures 4 x 5 x 5 ft, handles 950 gph

**What can be done with a balky, liquid-liquid extraction that costs plenty to keep it running right? Shell Chemical found the answer when it started using a centrifugal extractor for —**

## streamlined monomer-polymer separation

**Problem:** Monomer-polymer separation operation at Shell Chemical Company, Houston, Texas, required considerable equipment, space, and maintenance. Complex arrangement of the units resulted in the creation of many potential trouble spots where mechanical or process failures could occur. Rigid overall control was required at all times.

Overall residence time in operation was eight hours—making evaluation of changes in processing conditions difficult. Accurate control of pressure and heat was hard—especially during cold weather—and resulted in unsatisfactory operation.

In the process, the polymeric product is removed from a crude polymeric feed through solvent extraction of the monomer in the feed. Separation was carried out in two stages (see Fig. 2) and involved use of mixers, settlers, and accessory equipment.

**Solution:** Company revised the operation by installing a centrifugal counter-current liquid-liquid extractor in the process (see Fig. 3). Having a capacity of 950 gph, the 316 stainless steel unit occupies an area measuring about 4x5x5 ft high. Separation is carried out in centrifugal force field

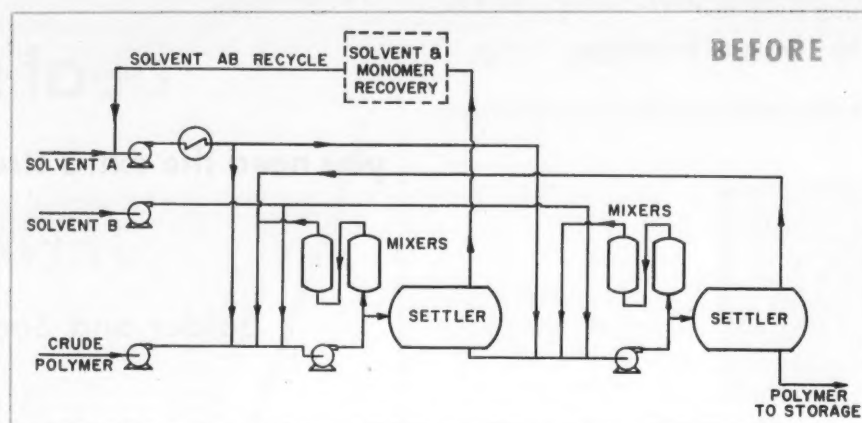


Fig 2—Monomer-polymer separation flow diagram at Shell Chemical before installation of centrifugal extractor

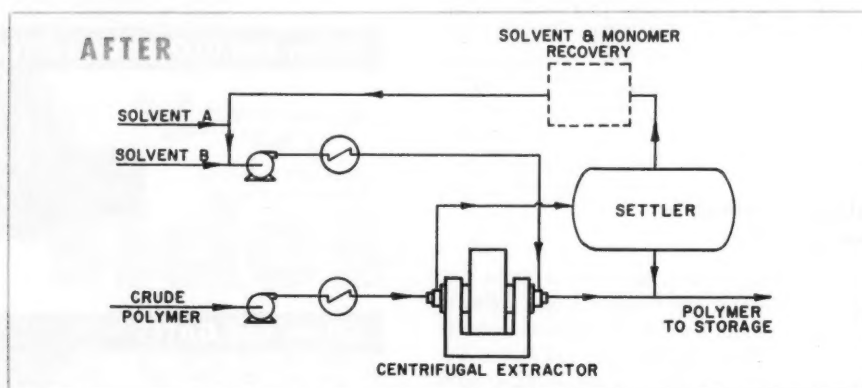


Fig 3—Monomer-polymer separation flow diagram after installation of centrifugal extractor. Unit replaced considerable amount of equipment, increased separation efficiency

ranging from 2000 to 5000 times gravity. Contact time is less than  $\frac{1}{2}$  minute. Extractor reaches equilibrium for full operation in less than 30 minutes. Unit is easy to operate and is instantly adjustable for complete range of interface position, reflux, flow rates, and solvent ratio.

Operation is as follows: crude polymer feed (1.15 sp gr, 110°F) is fed into machine and comes in contact with heated (90°F) solvent mixture (0.85 sp gr) being injected into extractor at opposite end. Contacting of the two liquid phases is effected continuously and counter-currently in annular spaces of the rotor passageway while rotor is revolving at high speed (see Fig. 4). Because of the differences in densities, lighter extraction solvent flows to ports at center of drum from which point it is discharged to settler.

Heavier polymer (sp gr 1.02) moves to periphery of rotor where it is discharged through passageways leading to rotor shaft and then out of machine to storage. By maintaining a back-pressure on light liquid outlet, the interface between the two con-

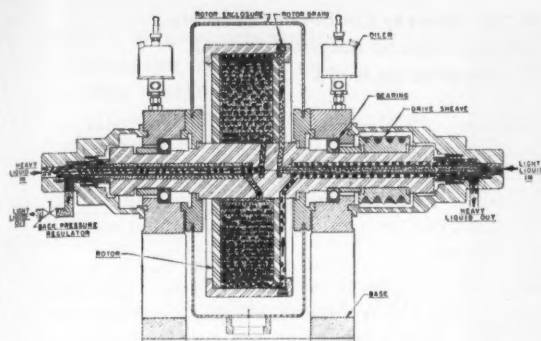


Fig 4—Cross-sectional view of centrifugal extractor, showing design, flow of liquids

tained liquids can be controlled at any desired position. Small amount of entrained polymer in solvent layer is separated in settler and combined with main product stream from extractor.

**Results:** Extractor has replaced a considerable amount of the bulky equipment. Process has been simplified and trouble spots eliminated. Maintenance on extractor is less than on accessory pumps. Overall residence time has been reduced to matter of minutes. Last but not least, separation efficiency has been markedly increased.

(Centrifugal Contactors are product of Podbielniak, Inc., Dept. CP, 341 East Ohio Street, Chicago 11, Illinois . . . or for more information check CP 6043 on handy form opposite last page.)

(For more "leads" to processing ideas and equipment, turn to the Processing section on page 166.)

### Proof of the pudding . . .



Just as "the proof of the pudding is in the eating", the true worth of a material, instrument, or piece of equipment can be determined only by its performance under plant conditions.

Each month, in the "New Solutions" section and elsewhere throughout the issue, CHEMICAL PROCESSING brings you performance reports on how recent product developments are doing their jobs in the plant. Such an article — about a specific installation — will help you judge whether the idea will fit your process.

## HOW TO BE A FILTRATION EXPERT

### In Two Easy Lessons

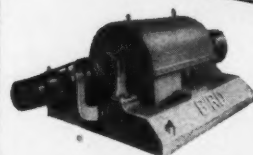
First, find the foremost source of filtration equipment — the company that engineers and builds more different kinds of filters than anyone else.

Second, ask that company to recommend the one best filter for the job and to back that recommendation with actual pilot-scale test data obtained from the world's finest laboratory devoted exclusively to solids-

liquids separation research and testing.

Bird builds the comprehensive range of filters you need.

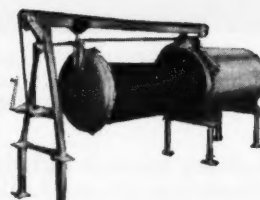
Bird operates the Bird Research and Development Center, a complete building by itself, designed, staffed and equipped expressly for the purpose of providing the actual facts and figures on filtration or they apply to each specific job.



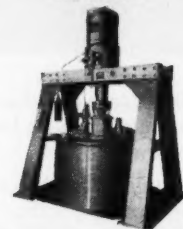
Bird Continuous Centrifugal Solid Bowl Filters



Bird Continuous Centrifugal Screen Filter



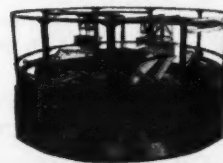
Bird Pressure Filters



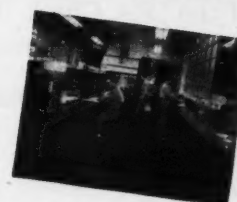
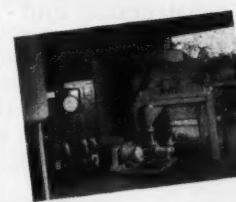
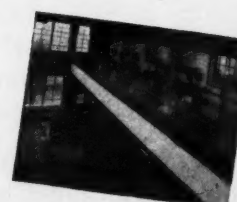
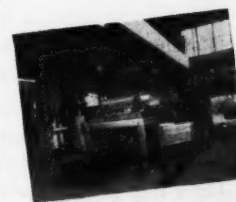
Bird Suspended Centrifugals



Bird-Young Continuous Vacuum Filters



AND NOW, the new Bird-Prayon Continuous Rotary, Vacuum, Horizontal Filter



The Bird Research and Development Center

# BIRD

## MACHINE COMPANY

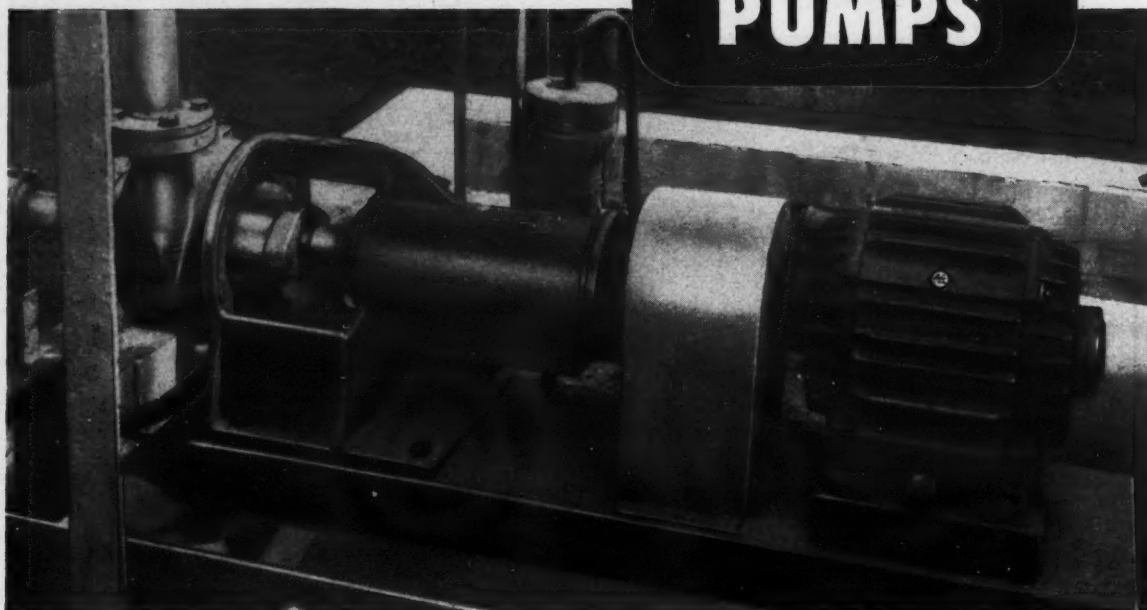
When inquiring check CP 6044 opposite last page



# Save Hundreds of Dollars

## on Many Process Pump Applications

ALLIS-CHALMERS  
**CHEMICAL  
PUMPS**



This pump will do many of the jobs of a costly refinery-type pump, yet it costs hundreds of dollars less to buy.

It isn't meant to do every job in the chemical industry. But it will handle a big percentage of the jobs. Check the construction and design features that make this possible:

- It's built in most used ratings . . . to 3500 gpm, heads up to 550 ft.
- Handles liquids in most common temperature range . . . up to 550 F.
- Pumps liquors, corrosive materials and solutions, and petroleum products.

- Built in wide choice of materials including: iron, bronze, aluminum bronze, stainless steel, high nickel alloys and others.
- Available with several sealing methods including standard packing, inside and outside mechanical seals, plus special features such as cooling water jacket, smothering gland and others.
- Features double-row, oil-lubricated bearings. Two oil rings running in generous reservoir of oil carry oil to bearings.
- Rigid cast-iron frame supports pump body and holds bearings in alignment.

Get complete information. Call your nearby Allis-Chalmers district office. Or write to Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 52B7638.

A-4527

# ALLIS-CHALMERS



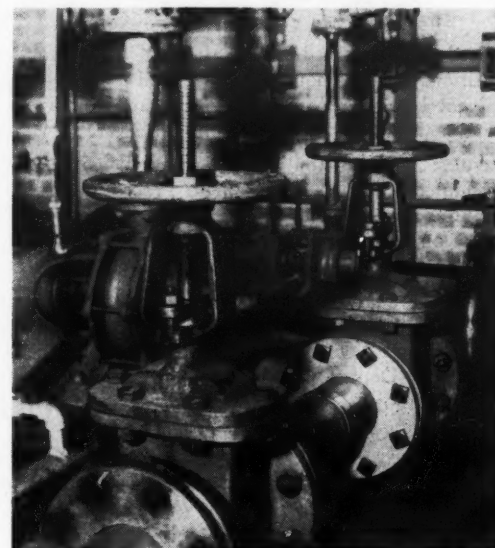
When inquiring check CP 6045 opposite last page

## NEW SOLUTIONS of processing problems

**At the Spencer Chemical Company, stainless valves handle formalin in strengths up to 35%**

**Problem:** Valves had to handle formalin in concentrations as high as 35% and with pH as low as 3.5 at the Chicago Works of Spencer Chemical Company. Plant catalytically oxidizes methanol to formaldehyde and severe corrosion problems had to be faced.

**Solution:** Spencer design engineers specified Aloyco No. 111-A flanged 150# gate valves for principal lines when plant was constructed over six years ago. These manually-operated valves are



Valve stems are packed with molded Teflon rings

made of type 316 stainless steel and have a bolted bonnet, outside-screw-and-yoke design. Smaller valves that were specified were the No. 90-A and 110 gate valves.

Gate discs are of double-disc construction, with ball-and-socket joints to reduce galling and insure a tight seat. Back-seating feature permits packing of valve stem when valve is open.

However, packing of valves is an infrequent chore now that molded Teflon rings have been used. This packing was installed over a year ago and is standing up well. Previous packings had to be replaced about every six months.

**Results:** Valves have stood up well over six years in this severe application, and are still giving excellent performance. Their ability to withstand action of the materials contributes to the extremely low iron content of Spencer's formaldehyde: 0.2 ppm average.

(Corrosion-resistant valves are a product of Alloy Steel Products Co., Inc., Dept. CP, 1301 W. Elizabeth St., Linden, N.J. Check CP 6046 opp. last pg.)

CHEMICAL PROCESSING

## NEW SOLUTIONS

### Hopper magnet cuts wear, maintenance on injection molding machine

**Problem:** Stray iron particles in reground plastic molding material were a constant source of trouble at Federal Tool Corporation, Chicago, Illinois. Besides the excessive wear and maintenance on the injection molding machine, there was always danger of product contamination and risk of serious damage.

Company inserts steel pins on the plastic emblems it manufactures. Rejected emblems are ground and



Operator of molding machine holds grate magnet used for removing iron particles

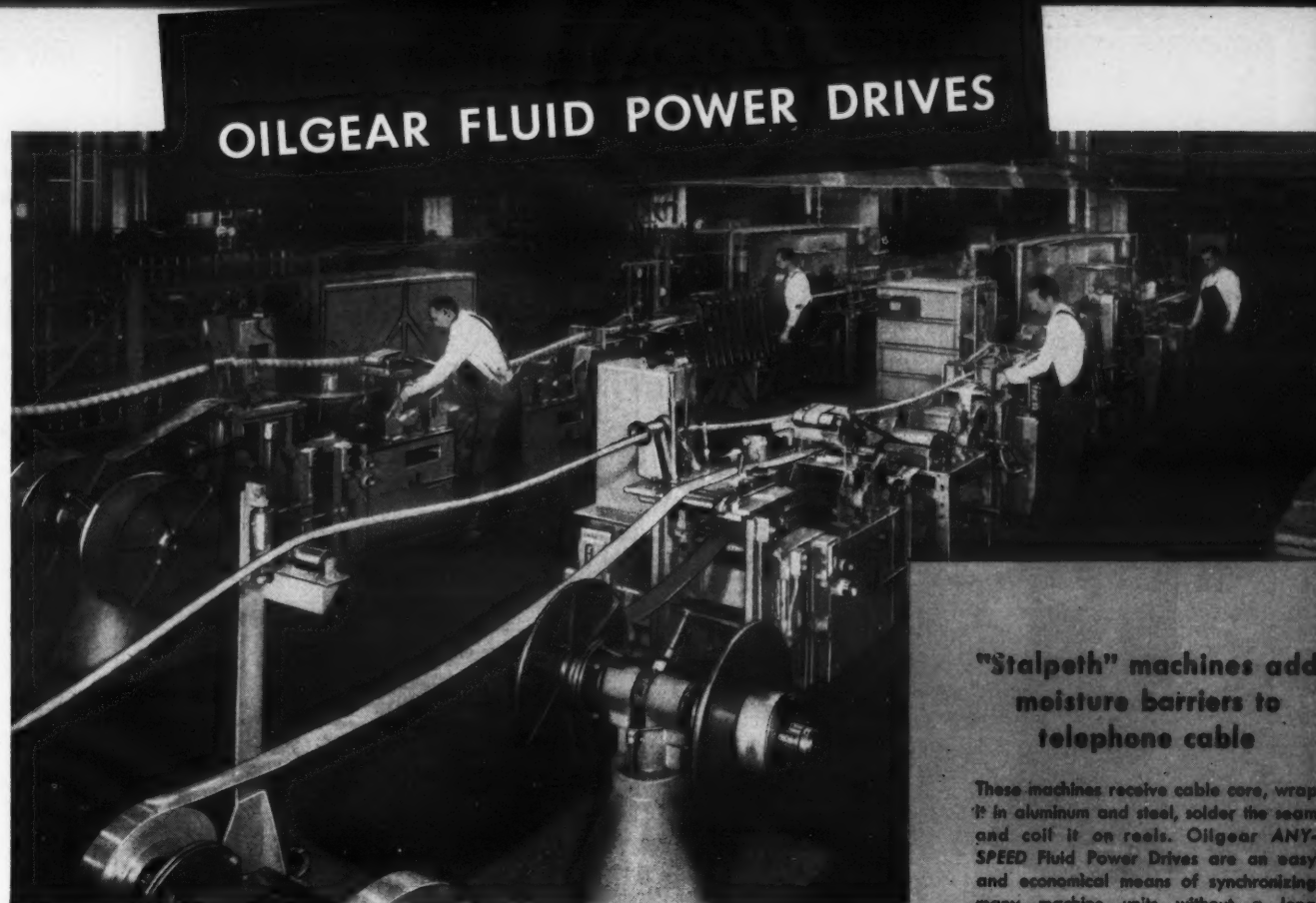
reused. In the recovery process, it is impossible to prevent a considerable portion of the pins from adhering to the plastic.

**Solution:** Company installed non-electric permanent grate magnet in hopper of molding machine. Consisting of a series of stainless steel tubes covering Alnico magnetic elements, unit simply lies in hopper, with tube ends resting against sides.

**Results:** Magnet removes all iron particles fast and efficiently. Magnetic strength is guaranteed indefinitely. Maintenance consists only of periodically wiping unit.

(Model P grate magnet is product of Eriez Mfg. Co., Dept. CP, 13 Magnet Drive, Erie, Pa. Check CP 6047 opposite last page.)

For more information on product at right, specify CP 6048 . . . see information request blank opposite last page.



### Solving the problem of close synchronization of driven members

As machines become more and more complex, combining more and more functions into a single unit, the problem of driving these machines successfully becomes more difficult.

This problem confronted Western Electric Company engineers in designing what they call their "Stalpeth" machines, two of which are shown above. These machines combine corrugating of steel and aluminum strips, forming them around the cable core, soldering the seam and then winding the assembly on reels at the far end. All of the members of the machine must be synchronized to the speed of the capstan unit. Going by their experience with other somewhat similar machines, Western Electric engineers again turned to Oilgear "Any-Speed"

Fluid Power Drives, to solve what is really a complex problem ordinarily. Oilgear units provided an easy and economical means of synchronizing many machine components.

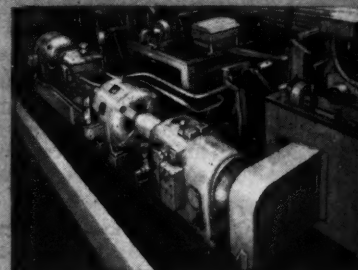
Oilgear *Any-Speed* Fluid Power Drives and transmissions do offer many machine design advantages including ease of control and synchronization of driven members, steplessly variable speed, fundamentally simple circuits, and long, trouble-free life. Write for Oilgear drive bulletins. THE OILGEAR COMPANY, 1583 W. Pierce St., Milwaukee 4, Wisconsin.



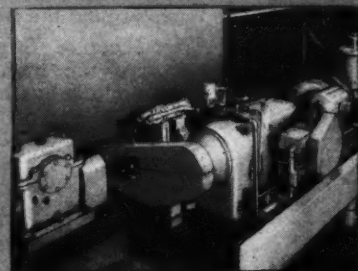
PIONEERS . . . NOW THREE PLANTS  
FOR FLUID POWER  
PUMPS, MOTORS, TRANSMISSIONS, CYLINDERS AND VALVES

### "Stalpeth" machines add moisture barriers to telephone cable

These machines receive cable core, wrap it in aluminum and steel, solder the seam and coil it on reels. Oilgear ANY-SPEED Fluid Power Drives are an easy and economical means of synchronizing many machine units without a long lineshaft.

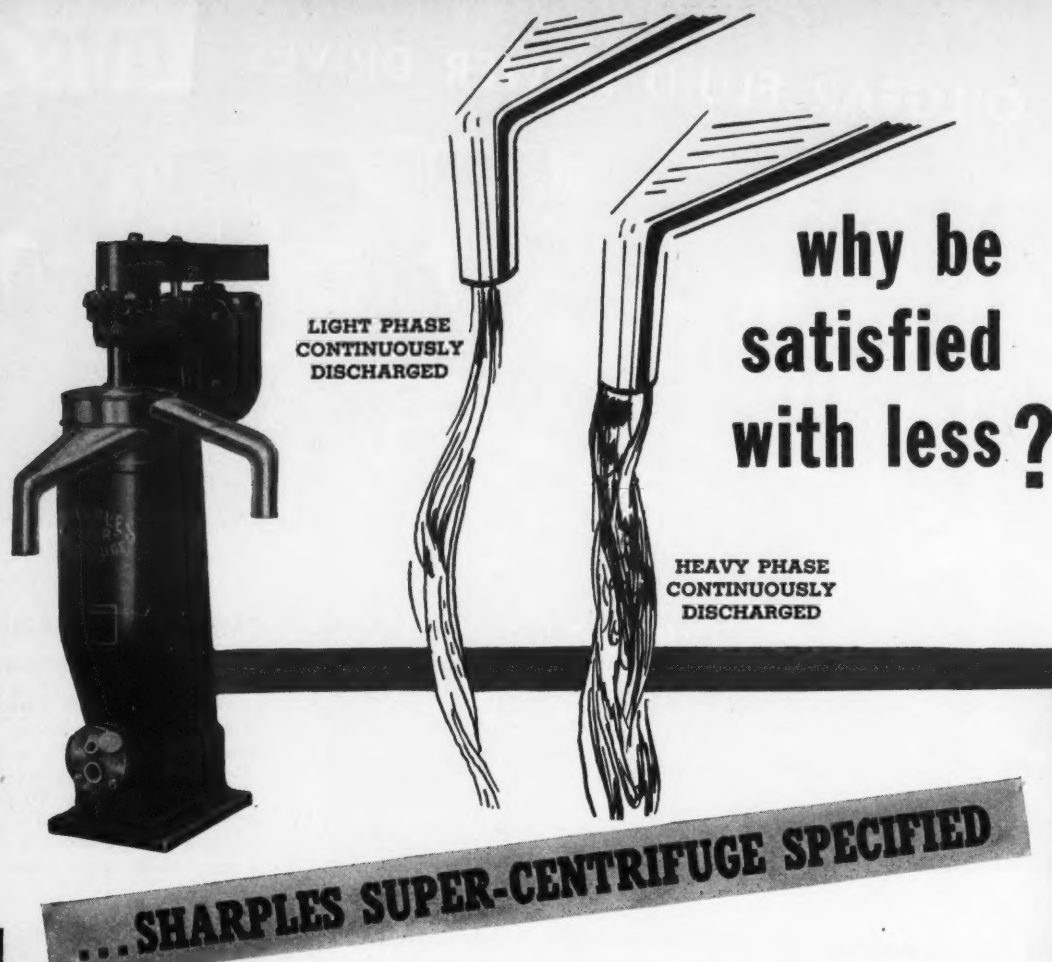


These Oilgear ANY-SPEED units drive the aluminum and steel corrugator units in perfect unison with the governing capstan unit.



The Oilgear ANY-SPEED capstan drive. Not shown here is another Oilgear unit driving the cable winding reels.





The tremendous separating force of 13,200 times the force of gravity opens to you an entirely new set of standards for the continuous clarification of liquids containing solids, or the separation of two immiscible liquids.

Such widely varied products as amyl acetate, sulphuric acid, apple juice, vaccines, light naphtha, beef broth, vegetable, citrus and fish oils, chloroform, pigmented lacquers, and water soluble waxes are among the hundreds of materials being handled daily in Sharples Super-Centrifuges around the world.

The Sharples Super-Centrifuge, which develops the highest centrifugal force commercially available, is a tubular bowl

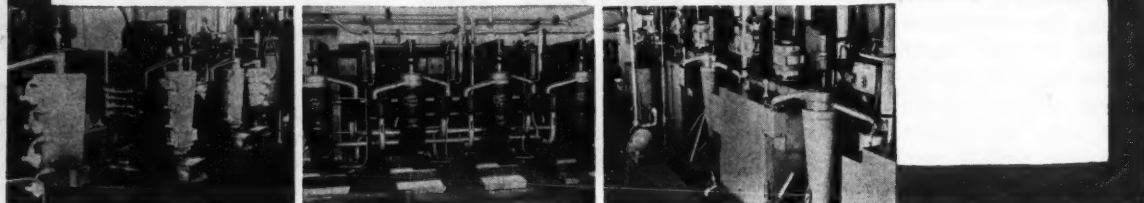
centrifuge with full flow-stream design which assures continuous maximum efficiency and throughput. Removal of solids is easy and quick—a matter of only a few minutes.

Take advantage of the significant extra performance inherent in the Sharples Super-Centrifuge. We will gladly discuss your needs with you. Bulletin 1248 will be sent upon request.

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**THE SHARPLES CORPORATION**  
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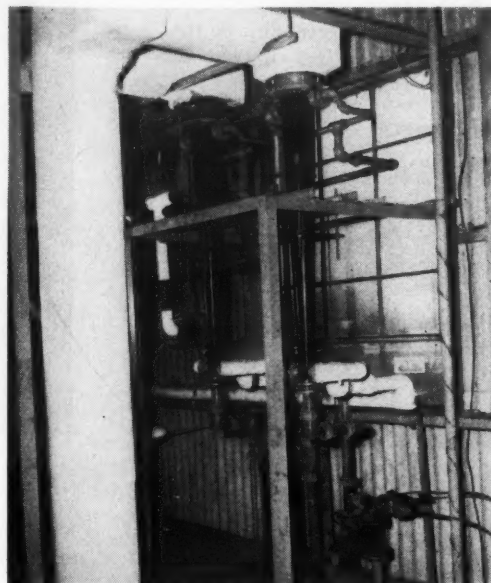
When inquiring check CP 6050 opposite last page

## NEW SOLUTIONS of processing problems

**Tantalum heaters and condensers not hurt by corrosive conditions at high temperatures . . .**

no maintenance at all has been needed on units

**Problem:** In designing equipment for a distillation operation at The Trubek Laboratories, East Rutherford, N. J., materials used had to be able to withstand extremely corrosive conditions at high temperatures. Impurities in product from corroding equipment could not be tolerated. Efficient heat transfer was also desired.



Two tantalum tapered condensers in use at Trubek

Product being handled is a high boiling acidic organic chemical used in the production of pharmaceutical intermediates. Since product is heat sensitive, close temperature control during distillation is imperative.

**Solution:** After consideration of a number of materials, tantalum bayonet heaters and condensers were placed in service two years ago.

The only materials which would equal tantalum in immunity to chemical attack would necessarily be non-metallic. Operating at the high temperatures required, a metallic material was considered to be best for this application since it would overcome the problems of thermal shock, and of temperature lag in process which requires close temperature control.

Evaporating equipment consists of two 3-tube tantalum bayonet heaters, each tube 1½" OD by 69" long. The two heaters provide about 13.25 sq ft of heat transfer area.

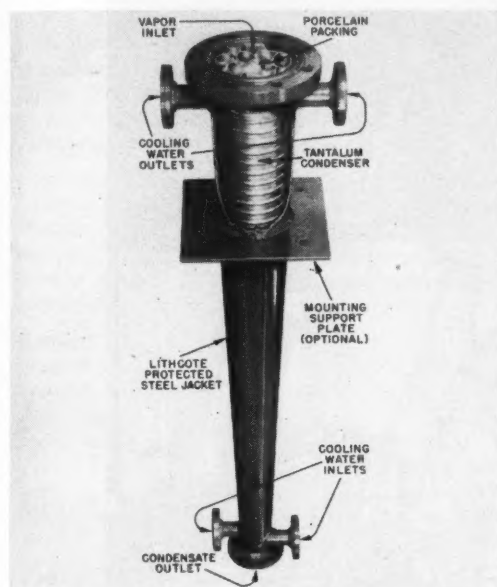
Condensation is carried out in two tantalum condensers, operating in parallel, containing about



10.5 sq ft of tantalum area and packed with porcelain Raschig rings. Product is condensed under a vacuum of 2 to 3 mm of mercury, using cooling water at a mean temperature of 17 to 18°C.

Aroclor, a chlorinated diphenyl, is used as the heating medium. This heat transfer oil is electrically heated to 260°C and pumped through the inside of the tantalum bayonets, furnishing about 200,000 Btu per hour to the process.

Foregoing process is used for a single product, which is produced at a rate of 400 to 500 lb per hr. A second unit, employing a single tantalum bayonet heater and one tantalum tapered condenser, is used for distillation of a number of different products. This evaporator is also heated with Aroclor at temperatures up to 280°C.



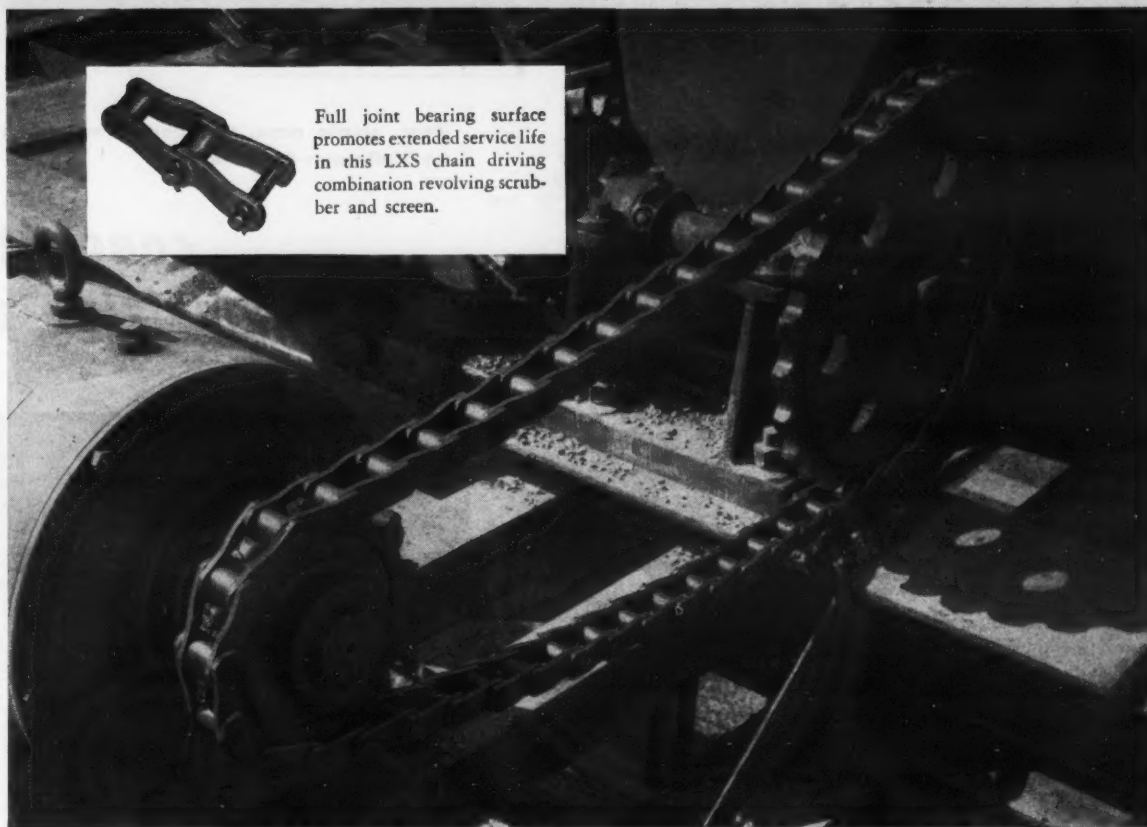
Tantalum condenser showing Raschig ring packing

**Results:** Corrosive conditions at high temperatures have been satisfactorily withstood by the tantalum equipment. No maintenance whatsoever has been necessary. According to the chemical engineer in charge of the process, the use of tantalum has greatly simplified not only the design of the equipment, but also the operations themselves. Analyses of the product have shown no evidence of contamination from equipment.

Use of tantalum, plus Aroclor heat transfer oil, has enabled plant to control operating temperatures to plus or minus 2°C.

(For further information on tantalum equipment contact Fansteel Metallurgical Corp., Dept. CP, N. Chicago, Ill. Check CP 6051 opp. last page.)

(Aroclor heat transfer oil is product of Monsanto Chemical Co., Dept. CP, 1700 S. Second St., St. Louis 4, Mo. Check CP 6051A opposite last page.)



## For heavy-duty, exposed drives -- it's LINK-BELT LXS chain

### LINK-BELT offers the chain that's best for every drive and conveying job

Accurate sizing of pins, bushings and pitch holes in Link-Belt LXS chains assures a tight fit of mating parts. This plus many other important features promotes longer chain life. That's why they are so widely used for exposed drives subject to repeated heavy loads and high impact.

Similarly, for other types of power transmission and conveying, Link-Belt builds chains with the characteristics required by the job. And it's this completeness of line that gives you the *right* chain for *your* requirements.

Ask your nearest Link-Belt office or distributor for the facts on the complete Link-Belt line of chains and sprockets.

No ONE chain serves every purpose — get the RIGHT one from Link-Belt's complete line



Class 800 ley bushed chain—for heavy duty, abrasive conveying and elevating.



Class C combination chain—popular, durable, low cost design for elevators, conveyors.



Class SS bushed roller chain with straight sidebars—particularly suited for apron conveyors, slat conveyors.



Link-Belt "Flint-Rim" cast sprockets give extra long life. Cast steel sprockets for most severe service.

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

**LINK-BELT**  
CHAINS AND SPROCKETS

When inquiring check CP 6052 opposite last page

# SEE WILSON FOR ALL 3

## Tube Cleaners

Wilson brings you a complete line of fast-acting tube cleaners. They handle every kind of deposit, hard or soft, thick or thin or variable in depth. Driven by air, steam, water or electricity, these powerful cleaners make quick work of cleaning straight or curved tubes.

## Tube Expanders

Wilson Tube Expanders are precision-made. Their smooth, efficient rolling action insures firm seating of the tube ... provides perfectly rolled joints ... reduces time-wasting re-rolling and re-inspection. There is a Wilson Tube Expander for every need from  $\frac{3}{16}$ " ID to 12" ID and up.

## Special Tools

Wilson also offers a wide range line of boiler maintenance and erection tools. The handy chamfering tool shown at right chamfers the tube edge to a 45° surface at high speed ... makes repairs much faster than outdated hand methods. Also available is an inside chamfering tool for placement of chill rings. Write for more information on these tools.

Representatives in all principal cities

**THOMAS C. WILSON, INC.**

21-11 44th AVENUE, LONG ISLAND CITY 1, N. Y.

CABLE ADDRESS: "TUBECLEAN" NEW YORK

# WILSON

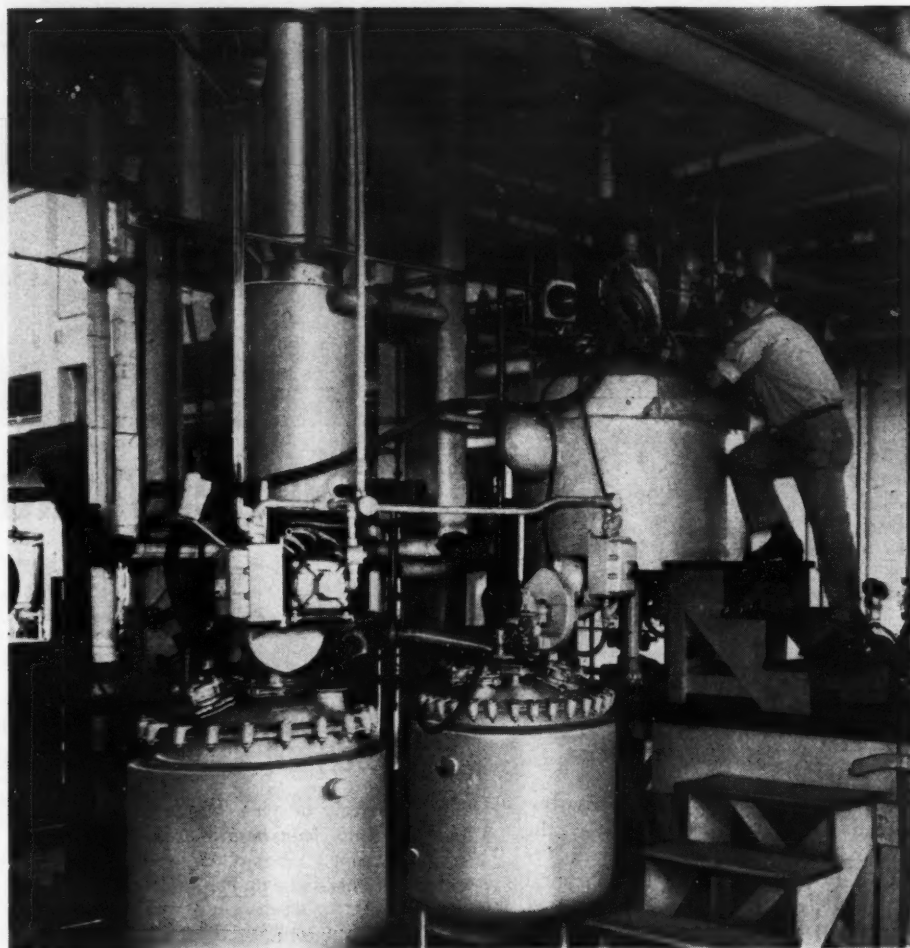
**TUBE CLEANERS • TUBE EXPANDERS**

When inquiring check CP 6053 opposite last page

**new solutions  
of processing problems**

**Fast, single pass, turbulent-film evaporator  
at Hoffmann-LaRoche —**

## *concentrates heat-sensitive pharmaceuticals*



Part of evaporation equipment used for concentrating pharmaceutical solutions

**Rotor blades assure uniform  
thinness of film, prevent  
erratic evaporation. Slight  
vacuum prevents oxidation**

**Problem:** Engineers were searching for a better way of separating heat-sensitive pharmaceuticals from a solvent mixture at the Hoffmann-LaRoche plant, Nutley, N. J. The operation was taking too much time and the existing equipment occupied too much space.

Rigid control was required because high film temperatures could seriously affect the delicate ma-

terial. Pro-  
heat for

**Solution:**  
evaporate  
evaporate  
per hour  
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1/32" of  
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**Solution:**  
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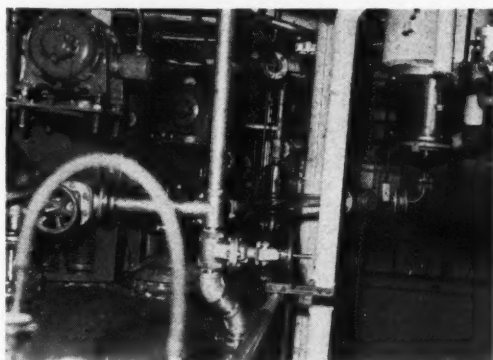
terial. Product had to be subjected to minimum heat for the least possible time.

**Solution:** Company installed two Turba-Film evaporators for the operation. Units have water-evaporation capacities of 400 and 800 pounds per hour. Evaporation takes place in a large, jacketed vertical tube. A controlled-speed agitator rotor extends down through the entire axis of evaporator tube. Blades attached to rotor come to within 1/32" of steam-heated chamber wall to keep film circulating evenly with a turbulent action. Upper expanded separating section of evaporator functions as entrainment separator and foam breaker.

Solution is pumped into top of evaporating section at rate of 50.9 lb/hr/sq ft and is whirled against the heated wall by rotor blades. Slight vacuum (20") on unit prevents oxidation. Vapors rise to separating section where revolving fins strike out entrained drops and permit them to run back down to evaporating chamber. Evaporation takes place rapidly and uniformly during continuous curvilinear flow of substance from top to lower end.

Concentrated liquid leaves evaporator at rate of 18-20 lb/hr/sq ft and enters brine-jacketed crystallization chamber where crystals are formed. Crystals are later removed by centrifuges and the mother liquid is reused. Evaporator reduces solution in a single pass to about 30% of unit volume.

**Results:** Production men report the crystalline product to be of a quality superior to that made by other processes. Crystal loss due to vapor condensation is negligible. Equipment requires less space, and processing time has been cut consider-



Close-up of take-off from base of evaporator (right). Concentrated solution goes to brine-jacketed crystallization tanks (left)

ably. Cleaning of evaporator, though rarely needed, is easily done. Company is installing an additional unit with capacity of 2500 pounds per hour.

(Turba-Film Evaporators are products of Rodney Hunt Machine Co., Dept. CP, 32 Vale Street, Orange, Massachusetts . . . or for more information check CP 6054 on form opposite last page.)

## The Right Amount of "Give" and "Take"

The Flexitallic Gasket that is engineered for your specific application has an ability to take care of itself and its job. It is self-adjusting to changes in operating conditions. It has just the right amount of "give" and "take". And here are the reasons:

Since 1912 — for forty-three years — Flexitallic engineers have concentrated on one product, spiral-wound gaskets—and on one goal, the perfection of those gaskets. It is the basic design and the manufacturing process, as much as the materials, that determine gasket characteristics. The engineering, the special machines and the quality control employed at Flexitallic give you the maximum in gasket performance and permanence — which, in turn, give you safety, low down-time and economy of operation.

Each Flexitallic Gasket is designed and engineered to meet specific conditions of thermal and physical shock, corrosion, vibration, weaving and unpredictable joint stresses. Spirally-wound V-crimped plies of required metal with alternating plies of proper filler result in a resilient gasket having characteristics of a calibrated spring.

Flexitallic Gaskets are at highest efficiency when bolted up cold at a predetermined load. For all pressure/temperature ranges from vacuum to 10,000 lbs. from extreme sub-zero to 2000°F. For all standard joint assemblies. In four thicknesses for special requirements: .125", .175", .250", .285". In diameters to 84" O.D.

**FLEXITALLIC GASKET CO.**  
8th & Bailey Sts., Camden 2, N. J.  
*Representatives in principal cities*

# Flexitallic

## SPIRAL-WOUND GASKETS

FOR FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

**TEFLON FOR SPECIAL APPLICATIONS**

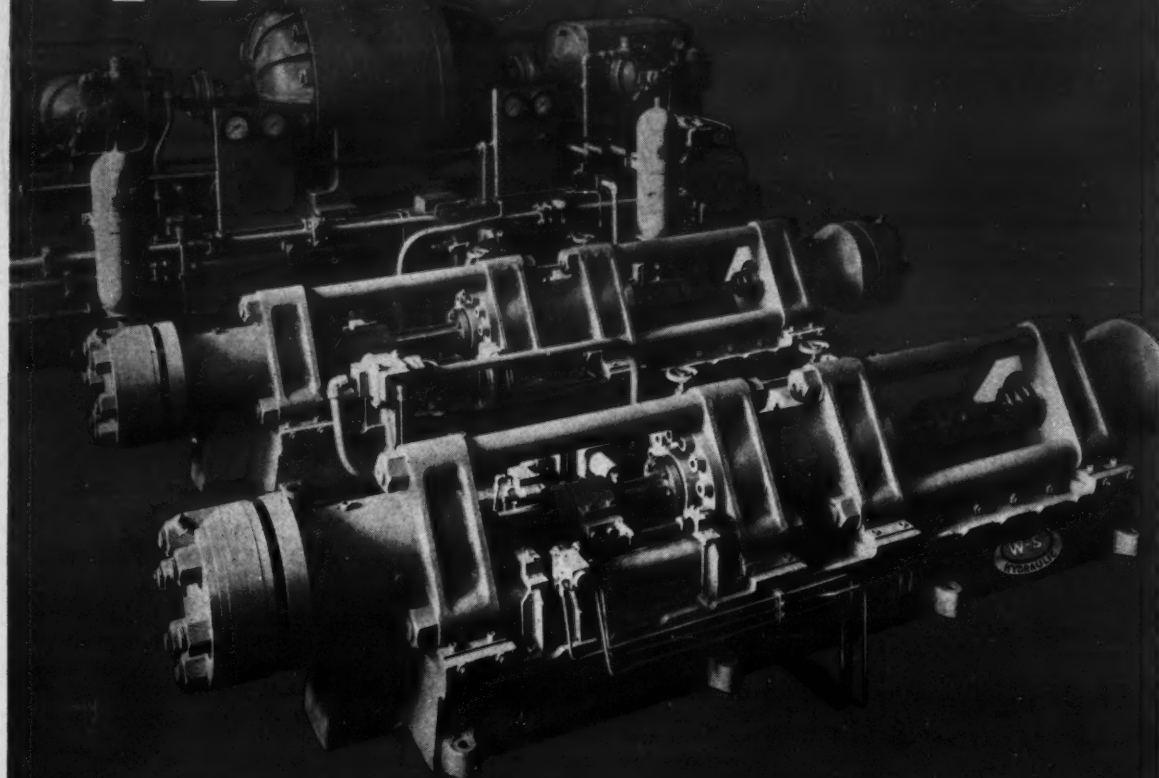
The ideal seal for many process applications is a Flexitallic Gasket with Teflon trapped between edges of stainless steel. Ask for folder, "Teflon in Flexitallic Gaskets."

\*Not all spiral-wound gaskets are Flexitallic. Look for Flexitallic Blue —it's our exclusive blue-dyed Canadian asbestos filler.

When inquiring check CP 6055 opposite last page



# LONGER LIFE



## WATSON-STILLMAN HIGH PRESSURE INTENSIFIER UNIT

For longer life, a high capacity, *low speed* Watson-Stillman intensifier unit offers you a sound approach to the solution of the problems of packing and fatigue at pressures up to 100,000 p.s.i. Because of its slower piston speed, and resultant low rubbing velocity, packings last longer. Slower cycling speed reduces the number of stress reversals, increases fatigue life in high pressure cylinder and valve block. At this low

speed of operation, you can expect 10 to 12 times the life of comparable high speed equipment.

High pressure intensifier units are only one of the Watson-Stillman "Compleline" of hydraulic machines and equipment. It will pay you to get in touch with W-S first, when it comes to vertical and horizontal pumps and accumulators, too. All W-S equipment is economical—both in first cost and operating cost.

**HK P**

THE WATSON-STILLMAN COMPANY  
DIVISION OF H. K. PORTER COMPANY, INC.

150 Albany Rd., Roselle, New Jersey

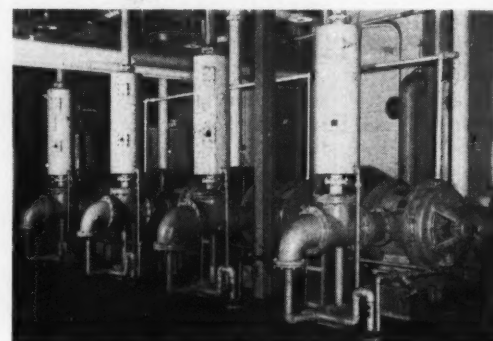


### NEW SOLUTIONS of processing problems

**Practically no maintenance  
during three years service  
of large vacuum pumps . . .**

units continuously maintain 24" of vacuum for operation of giant filters

For more than three years, a battery of four large vacuum pumps have operated continuously with practically no maintenance at Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y. Units maintain 24" of vacuum on four huge Oliver filters which handle fermented mash used in the manufacture of Aureomycin chlorotetracycline. Pumps were placed in service in 1951.



Battery of pumps which supply vacuum for operation of filters at Lederle Laboratories

Reason vacuum pumps have provided dependable service is that they are simply constructed without mechanical complications. A single moving part, the rotor, with shrouded blades forming a series of buckets, revolves in an elliptical casing. Operation is without pulsation or vibration. No internal lubrication is employed. Capacity of each of units is 1100 cfm, measured at the intake.

(Vacuum pumps are product of Nash Engineering Co., Dept. CP, S. Norwalk, Conn. . . . or check CP 6057 opposite last page.)

### Combination cleaning method saves pipeline

How chemical-mechanical cleaning eliminated need for replacing a 6-in 600-ft long water line is described in two-page bulletin. Scale deposits had reduced inside diameter of pipe to about 3½ inches, causing serious loss of flow capacity. Chemical action of solvents plus mechanical action of spring-brush type pipeline pig, removed about 98% of deposits first time.

Bul on pipeline cleaning method is issued by Dowell Incorporated, Dept. CP, P.O. Box 536, Tulsa 1, Oklahoma. When inquiring specify CP 6058 on handy form opposite last page.

When inquiring check CP 6056 opposite last page

Remember — the trade marks "tt" and "TUBE-TURN" are applicable only to products of TUBE TURNS.

tt  
**TUBE-TURN**  
TRADE MARK

## STAINLESS STEEL

...fights corrosion...solves many piping problems

● Stainless steel piping, using TUBE-TURN\* Stainless Steel Welding Fittings, can provide long, safe service where corrosive gases or fluids are handled. Likewise, stainless steel systems are superior where temperature extremes are encountered, for handling dangerous materials safely, for preventing contamination.

Tube Turns offers a *complete line* of Stainless Steel Welding Fittings in three analyses: AISI Type 304, Type 347, and Type 316; and in four schedules: 5S and 10S (thin wall), and 40S and 80S (heavy wall). For the *right* stainless steel welding fittings, and for help in proper application, get in touch with your Tube Turns' Distributor. You'll find one in every principal city.

TUBE-TURN Welding Fittings and Flanges are made in U.S.A.  
They meet all U.S. piping code specifications

**TUBE TURNS** LOUISVILLE 1,  
KENTUCKY

A Division of National Cylinder Gas Company

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Cleveland • Detroit • Chicago • Denver • Los Angeles  
San Francisco • Seattle • Atlanta • Tulsa • Houston • Dallas • Midland, Texas

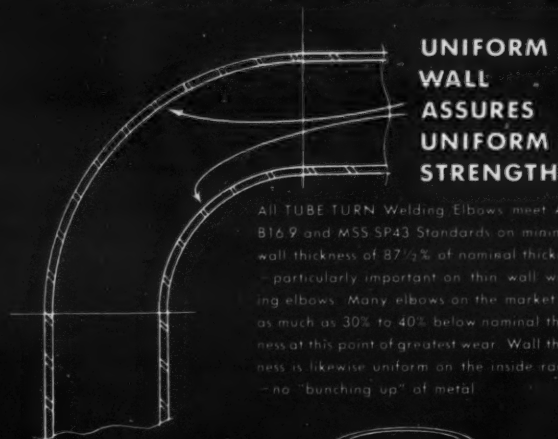


\*"tt" and  
"TUBE-TURN"  
Reg. U.S.  
Pat. Off.

STAINLESS DATA

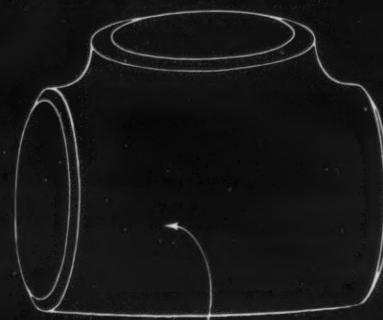
# How you get extra service from TUBE-TURN\* Stainless Steel Welding Fittings

## EXTRA-VALUE FEATURES AT NO EXTRA COST



**UNIFORM  
WALL  
ASSURES  
UNIFORM  
STRENGTH**

All TUBE-TURN Welding Elbows meet ASA B16.9 and MSS SP43 Standards on minimum wall thickness of 87½% of nominal thickness—particularly important on thin wall welding elbows. Many elbows on the market are as much as 30% to 40% below nominal thickness at this point of greatest wear. Wall thickness is likewise uniform on the inside radius—no "bunching up" of metal.

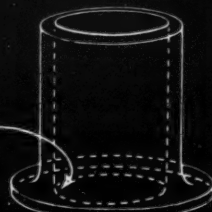


**MATCHES PIPE  
BURSTING STRENGTH**

Welding Tees are adequately reinforced. Along with other TUBE-TURN Welding Fittings their strength matches the calculated bursting strength of the pipe.

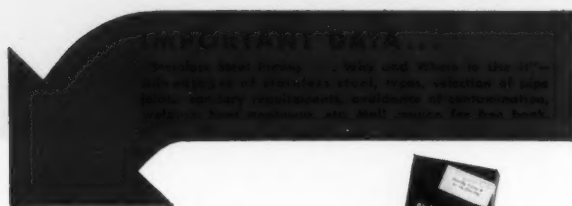
**NO CORROSION  
POCKETS**

TUBE-TURN Lap Joint Stub Ends have a square inside corner which eliminates a "corrosion pocket" and a proper fillet radius which assures strength under flexing and vibration.



## MEET ALL CODES

TUBE-TURN Stainless Steel Welding Fittings meet all specifications: ASTM A312 (for material); MSS SP43 and ASA B16.9 (for dimensions); and MSS SP25 (marking procedure).



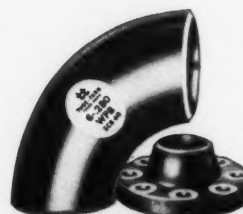
**TUBE TURNS, Dept. KK-2**  
224 East Broadway, Louisville 1, Kentucky  
Please send STAINLESS STEEL "WHY AND WHERE" book.

Company Name \_\_\_\_\_  
Company Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_  
Your Name \_\_\_\_\_  
Position \_\_\_\_\_

## CHECK THESE FEATURES Only TUBE TURNS offers them all

- Fittings meet standard chemistry specifications
- Minimum wall thickness of elbows 87½% of nominal
- Fittings meet minimum calculated bursting pressure of matching pipe
- Qualified welders and procedures used where welding is required
- Each fitting properly solution heat treated
- Each fitting passivated
- Other special grades of stainless steel, and all other alloys available

All these extra value features available to you at no extra cost.



## DISTRICT OFFICES

New York	Los Angeles
Philadelphia	San Francisco
Pittsburgh	Seattle
Cleveland	Atlanta
Chicago	Tulsa
Detroit	Houston
Denver	Dallas
	Midland, Texas

\*"tt" and "TUBE-TURN" Reg. U.S. Pat. Off.

# TUBE TURNS

A DIVISION OF NATIONAL CYLINDER GAS COMPANY  
LOUISVILLE 1, KENTUCKY

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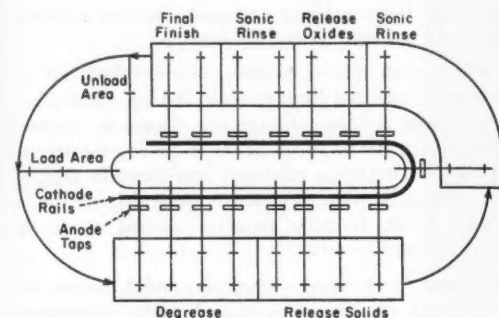
## NEW SOLUTIONS of processing problems

### Electrolytic cleaning process cuts mold costs 30 per cent in glass-bottle plants . . .

removes no metal from molds; replacement expenses practically eliminated

Reported to be first significant change in glass-mold cleaning in 30 years, electrolytic cleaning process is said to be able to reduce annual mold costs in bottle plants by over 30%. Process involves no mechanical cleaning action, and no metal is removed from the mold itself.

Fully automatic, system results in sizable labor savings too. In test plant, it was found that there would be 75% less labor needed in cleaning opera-



Drawing shows layout and operations involved in electrolytic cleaning process for glass molds

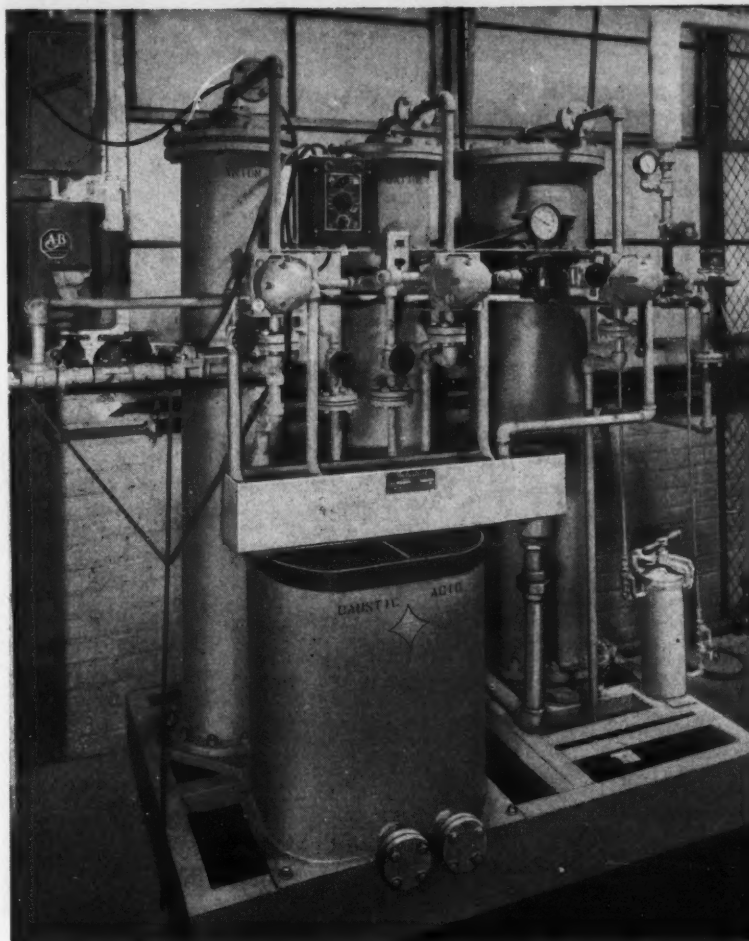
tion, and 30% less in the mold repair department. Total overall savings in the plant were estimated to be \$250,000 annually.

In the process, dirty glass molds (containing grease, graphite, sulfur, sulfides, and oxides) are placed in individual anode fixtures and attached to carrier arms of an automatic conveyor. Molds then pass through 1) degreasing, 2) solids release, 3) sonic rinse, 4) oxides release, 5) another sonic rinse, and 6) final finish.

High degree of current distribution from anode gives mold's surface thorough gaseous scrubbing. In addition to fixtures and conveyor, equipment includes six treatment tanks and selenium rectifiers. Components were designed by Hanson-Van Winkle-Munning Company, Matawan, N. J.

(Glass-mold cleaning process is development of Electro-cleaning, Inc., Dept. CP, 2441 East 83rd Street, Cleveland 4, Ohio . . . or for more information check CP 6059 on handy form opposite last page.)

For more information on product at left, specify CP 6060 . . . see information request blank opposite last page.



## Industrial tailored treating units pay for themselves

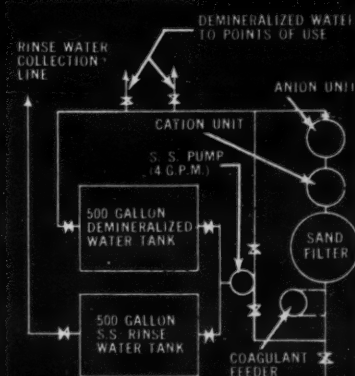
INDUSTRIAL units for the treatment of metal finishing wastes are used for the recovery of precious metals and for supplying demineralized water for stainless rinsing. The value of the recovered metals, reuse of demineralized water in the recirculating system, and the elimination of troublesome contaminants all add up to pay for the installation, frequently within a matter of months.

Complete INDUSTRIAL Systems are individually engineered and built to meet specific waste treatment problems. Write for full particulars and recommendations.

**treating  
plating  
rinse  
wastes  
at**

**Sunbeam**  
CORPORATION  
CHICAGO 50, ILLINOIS

INDUSTRIAL waste treating unit consisting of rubber-lined sand filter with coagulant feeder, cation and anion exchangers complete with pumps, used for treating plating rinse water to remove gold and nickel salts, remove sulfuric and boric acids and return demineralized water to the recirculating system.



Flow diagram of the INDUSTRIAL System for the demineralization of recirculated rinse water.

**INDUSTRIAL FILTER & PUMP MFG CO.**

PRESSURE FILTERS  
ION EXCHANGERS  
RUBBER LININGS  
HEAT EXCHANGERS  
CENTRIFUGAL PUMPS

When inquiring check CP 6061 opposite last page

the

# BIGGER

they come



... the more exacting workmanship and knowledge required to build complicated welded steel plate structures. The 8-ft. diam. by 80-ft. CO<sub>2</sub> absorber tower shown above is an example. This structure was built by CB&I to exacting specifications under contract from Foster Wheeler Corporation for the Grace Chemical Company at Woodstock, Tennessee.

CB&I is a specialist. Their experience, ability and facilities will provide you with the best when your requirements are the greatest. Write our nearest office for further information.



## Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston  
Los Angeles • New York • Philadelphia • Pittsburgh • Salt Lake City  
San Francisco • Seattle • Tulsa • Washington

Plants in  
BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

When inquiring check CP 6062 opposite last page

## NEW SOLUTIONS of processing problems

### Silica, cement losses eliminated by automatic weighing system in cinder block plant . . .

company achieves complete control over operation, is assured high accuracies

**Problem:** Several hundred pounds of silica were being lost daily in mixing operation at National Brick & Supply Company's cinder block plant, Washington, D. C. Losses were predominantly in overages.

Silica was dropped into a wheelbarrow through discharge gate located at bottom of silica storage bin. When silica reached a level mark on inside of wheelbarrow, loading operator would jam-close the gate — frequently spilling and losing material. Besides being wasteful, method created dust and potential silicosis hazard.

Cement, also used in process, was weighed out in manually-operated hopper scale fed by screw conveyor from outdoor storage bin. Losses in cement handling operation likewise were predominantly in overages. There was relatively less waste in weighing operation, but total losses were higher since cinder block formula required almost twice as much cement as silica.

**Solution:** Feeding, weighing, and handling of silica and cement were placed under automatic controls. Materials are fed into two automatic scales from storage bins via screw conveyor. Scales are set to receive prescribed amount, and screws automatically stop when correct weight is reached. When operator wants to put materials into mixer, he discharges scales, dropping materials onto Fuller Airslide conveyor which sends them to mixer. After scales are discharged, screws start feeding again automatically. Timing is such that fresh batches of silica and cement are always on hand.

Scales are enclosed in single housing equipped with one discharge spout. Both scales are capable of turning out several weighings per minute. They are equipped with radial-type cut-off feed gates, a low-multiplication scale beam, and a weigh hopper with two straight sides for clean discharge.

Construction is dust-proof, and scales have accuracies of 1/4 to 1% of all material weighed. The two are presently set to deliver 230 pounds of cement and 130 pounds of silica, but may be changed according to demands.

**Results:** For all practical purposes, all former waste has been eliminated. Company has achieved complete control over weighing and materials handling operation, and is now getting weighing accuracies of the highest order.

(Automatic scales were designed and built by Richardson Scale Company, Dept. CP, Van Houten Avenue, Clifton, N. J. . . . or for more information check CP 6063 on handy form opposite last page.)

### Pipe sys from 2 w by SS tu

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## NEW SOLUTIONS

### Pipe system life upped from 2 wk to 10 yr by SS tube

By switching to 304 stainless steel tube and pipe, Alyward Fertilizer Company, Sullivan, Illinois, has stretched the service life of its entire pipe system from 2 weeks to an expected 10 years. Continual maintenance, formerly needed, has also been eliminated.

Corrosion of tube was principal problem in company's liquid fertilizer process. More than 300 feet of tube are used. Other materials just wouldn't stand up against the 75% phosphoric acid, 62% potash, 24.6% aqueous ammonia, and 46% urea solutions.

Temperatures of the reagents varied from 20° to 180°F. Since the business is seasonal, it was especially vital for the company to solve the problem. Shut-downs at the height of mixing cycles can be quite costly.

(Stainless tube and pipe are products of Alloy Tube Division, The Carpenter Steel Company, Dept. CP, 110 Springfield Road, Union, N. J. Check CP 6064 opposite last page.)

### Tells how waste water treatment pays off

How costly waste water programs can be made to pay off in improvements to product quality, reduction of direct and indirect water costs, improvement of process methods, and reduction of water consumption, is cited in six-page folder. One example tells how savings attained paid for entire program in two years.

"Waste Water" is issued by Hall Laboratories Inc., Dept. CP, 323 Fourth Avenue, Pittsburgh 22, Pa. Specify CP 6065 opposite last page.

For more information on product at right, specify CP 6066  
... see information request blank opposite last page.

# Centrifugal

## SOLID PLASTIC PUMP

The fluid end of this pump is solid plastic, not simply lined or coated. The chemical resistance exists throughout instead of being confined to a thin surface layer. The plastic is a composition known by the trade name of HAVEG which is exceptionally resistant to most acids, bases, and salts, to chlorine, and to many solvents and other chemicals excepting those of a highly oxidizing nature. It can be used continuously at temperature ranges to 265° F.

Capacities to 325  
gpm, Heads to 158  
feet, 2-inch dis-  
charge, 3-inch suc-  
tion, one size only.

# MISSION

MANUFACTURING CO.

HOUSTON, TEXAS

Humble Road, P. O. Box 4269, Phone OX 4-5561  
Export Office: 30 Rockefeller Plaza, New York  
Handled by representatives in all industrial areas  
... and by supply stores in every oil country.



## Two more BAKER PERKINS continuous-mixing KO-KNEADERS (LIST SYSTEM) now on the job

MODEL K-400-1M  
30 H.P. DRIVE MOTOR

A switch from the batch process to continuous is now possible in many mixing, blending, and kneading operations, by use of these new Baker Perkins Ko-Kneaders. The two models shown here are both for Kneading heavy masses . . . chemicals, margarine, soaps, rubber, and plastics such as polystyrene, PVC, polyethylene, or acetate. They can be used to disperse colors in a vehicle, as well as countless other mixing and kneading applications.

MODEL K-300-1M  
40 H.P. DRIVE MOTOR

In many phases of the chemical industry the mixing process has been a bottleneck because it was a batch operation. The Baker Perkins Ko-Kneaders break this bottleneck by converting to continuous mixing. When installed with the proper feeding and output handling equipment, these Ko-Kneaders make mixing largely automatic, and result in a better quality product along with savings in production costs.

**BAKER PERKINS INC.**  
**CHEMICAL MACHINERY DIVISION • SAGINAW, MICHIGAN**

When inquiring check CP 6067 opposite last page

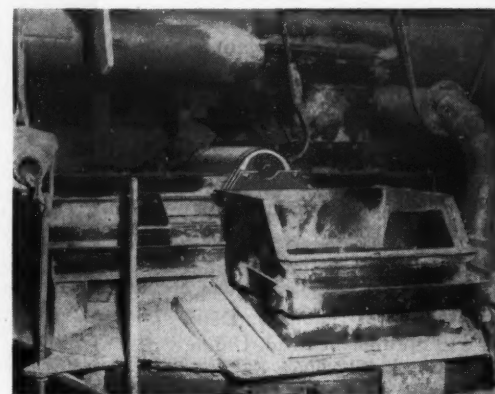
## NEW SOLUTIONS of processing problems

### Over 1 ton gypsum/min handled by high-speed screen . . .

rapid oscillation reduces blinding, conglomerating tendencies of hot, pulverized material

**Problem:** Bagging equipment was getting damaged and product being contaminated because tramp iron and other foreign matter was getting past screening operation at a large gypsum plant. To prevent blinding and to keep up with production, screens with 1" openings or larger had to be used. The hot, pulverized gypsum is non-free-flowing and has tendency to conglomerate before passing through screens.

Due to space limitations, any new equipment had to be mounted directly on top of weighing hop-



Totally enclosed high-speed screen mounted on top of scale hopper at gypsum plant. Gypsum enters unit from screw conveyor (top). Vibration is so completely isolated that scale's weighing mechanism is undisturbed. Arrow indicates eccentric motor

pers, where there is less than 24" head room. But bad vibration would interfere with scale readings.

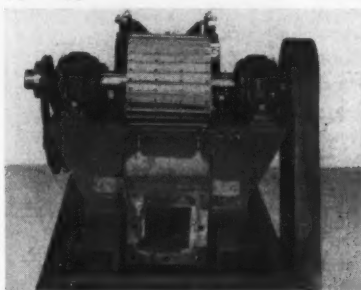
Gypsum is screened, blended with other ingredients, and made into plaster, etc.

**Solution:** Company installed a Derrick high-speed oscillating screen on top of each of the two hoppers. Machine occupies area approximately 2 x 5 ft and has about 8 sq ft of screening surface. Screen openings measure 5/16".

Constructed entirely of steel, the unit lays flat and is totally enclosed. Material is fed in at one end and distributed by the vibrating action over entire surface of screen. Foreign matter collects at other end where it is periodically removed.

Oscillation amplitude is adjusted by a quick setting of weights on numerically-graduated, eccentrically-loaded flywheel of motor. Unit's 1-hp motor operates at 3600 rpm, is interchangeable, and can be mounted on a variety of screen frames to suit specific applications. Special float mountings confine vibrating action to screen body.

**Dice**  
**5,760,000 PELLETS**  
**PER**  
**MINUTE**



**use Taylor-Stiles  
 No. 700**

## **PELLETER**

This new pelleter cuts plastics extruded in rod form into evenly sized pellets without fines or longs.

The cuts are clean and free from feathers. The machines are made in two sizes, 5 3/4" and 10" in width.

It has up to 30 fly knives and may be operated at speeds that will produce 5,760,000 pellets per minute.

*Write for four page folder.*

**TAYLOR-STILES**  
*Company*  
 CUTTING MACHINES & KNIVES

20 Bridge Street Riegelsville, N. J.

When inquiring check CP 6068  
 opposite last page

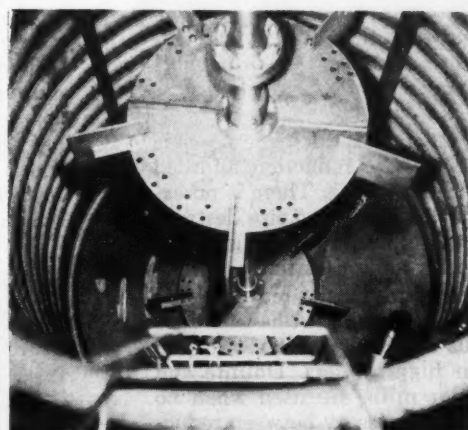
## **NEW SOLUTIONS of processing problems**

Screen cloth is supported in hoop tension so that it becomes an integral part of the machine. Because of this, flutter and destructive fatigue are eliminated, and vibration is transmitted evenly across screen. Unit can be operated at any angle.

**Results:** Equipment damage and product contamination have been entirely eliminated. With each machine handling over a ton per minute, entire plant production has actually increased. High oscillational speed of unit minimizes blinding and discourages conglomeration. Vibration is so completely isolated that weighing mechanisms on scales are undisturbed.

Machines have been in operation daily for several years. Screen material is replaced only once a year.

(Screens are product of Derrick Manufacturing Company, Dept. CP, 1754 Walden Avenue, Buffalo 25, N. Y. Check CP 6069 opposite last page.)



**... They had to be easy to clean!**

Antibiotic fermenter tanks, 10,000-gal size, had to be easy to hose out and clean, and couldn't clog up to cause production delays at Abbott Laboratories, North Chicago, Ill.

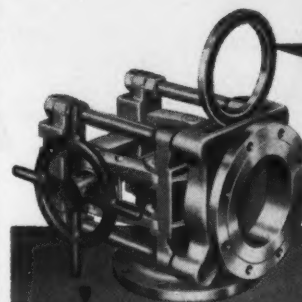
Type 316 stainless steel was found to resist action of fermentation mixture, and permit easy cleanout of the sticky residues. Therefore all internal parts (cooling coils, agitator, and shaft) are 316. Shells and heads are Type 316 20% stainless-clad, 3/8 and 1/2 inch thick, respectively.

Eleven tanks have given satisfactory service for approximately four years, requiring only normal maintenance.

(These stainless steel fermenter tanks were built by Leader Iron Works, Inc., Dept. CP, Decatur, Ill. . . . or for more information check CP 6070 opposite last page.)

*Impenetrable*

**HAMER**



*Job at Richfield's  
 Refinery*



*After testing their action in a trial installation, Richfield now uses Hamer Line Blinds extensively at its refinery at Watson as illustrated above.*



## **HAMER Visible Shut-off LINE BLIND VALVES**

### **HAMER Plug Valves**

Thousands of users have proven the easy and immediate operation of Hamer Plug Valves. Will not stick or freeze.



Refinery operations require a valve that will provide a continual leakproof line shutoff. Hamer Blinds with their foolproof sealing action are unsurpassed for providing an absolute line seal that's both positive and permanent. In addition, Hamer Blinds fast, one minute, one man operation literally pay for their cost in downtime saving.

*Send for FREE Catalog*

**HAMER**

**VALVES, INC.**

2919 Gardenia Ave., Long Beach 6, Calif.  
 Representatives throughout the World

When inquiring check CP 6071 opposite last page



## ACTIVATED CHARCOAL PROCESSOR INCREASES YIELD FROM 53% TO

# 76%

**ALLIS-CHALMERS  
ROLLER  
MILL**

### Single Pass Multiple Stage Milling Paid for Itself First Year!

By replacing a hammermill yielding 53% of usable product with a modern Allis-Chalmers two pair high roller mill, a charcoal processor increased his minus 10, plus 28-mesh screen yield to 76%.

Because of the increase in yield, this mill, operating with an Allis-Chalmers gyratory screen, paid for itself in less than a year!

This big increase was made possible by the gentle size reduction afforded by roller mill grinding. There is no excessive shattering and no size destroying impact. And, multiple stage grinding in roller mills minimizes fines.

To meet your varying requirements in chemical processing, Allis-Chalmers roller mills are built in one, two and three pair high models. Double and triple roller mills are used when no separation is necessary between reductions. Roll lengths range from 18 to 42 inches in 9 and 10-inch diameters.

For complete information on roller mills and other equipment for your industry, call your A-C representative or write Allis-Chalmers, Milwaukee 1, Wis.

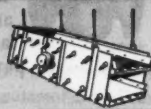
#### Other Processing Equipment for the Chemical Industry



Grinding Mills



Kilns, Dryers, Coolers



Vibrating Screens



Compacting Mills



Gyratory Screens



Man-Lifts

# ALLIS-CHALMERS



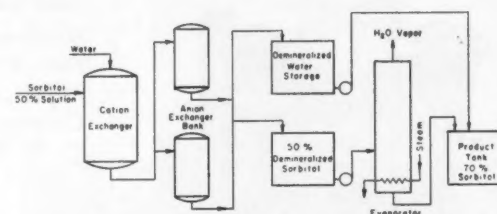
When inquiring check CP 6072 opposite last page

#### NEW SOLUTIONS of processing problems

#### Atlas Powder purifies sorbitol by ion exchange . . .

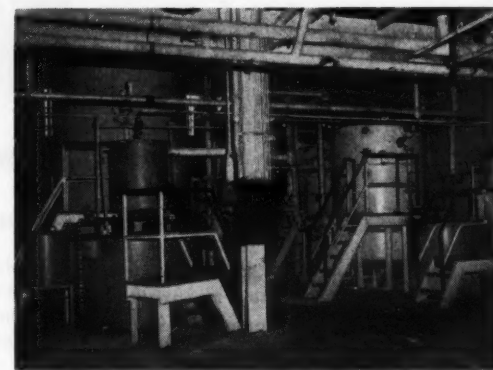
removal of salts in operation results in water-white product

**Problem:** In initial work on sorbitol, Atlas Powder Company was faced with the problem of removing traces of salts from the product. In early development work it was found that the sorbitol solution contained traces of chlorides and sulfates of iron and nickel.



General view of ion exchange equipment in use at Atlas Powder

**Solution:** Ion exchange was suggested as a method for removal of these salts. All of the available resins were tested, the most suitable ones being selected for use in the purification process, which is based on double ion exchange (cationic followed by anionic). Rubber-lined ion exchange equipment shown in accompanying photographs



Automatic regeneration, as well as continuous pH and conductivity control, are furnished by most recent unit placed in service

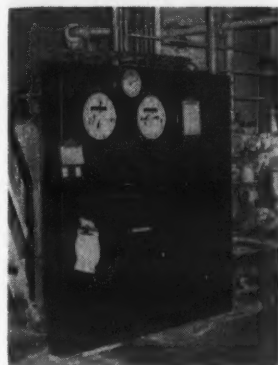
was placed in service. The first unit was manually operated. Later, a larger unit having automatic regeneration and continuous pH and conductivity control was placed in service.

Sorbitol is treated in the form of a solution of approximately 50% concentration. Product is distributed uniformly over the top surface and forced through the resin bed. At the end of the sorbitol demineralization, the system is "sweetened off". In order to reduce the consumption of water, the process of "sweetening off" is begun with dilute



"sweet water" from the previous cycle. Unit also demineralizes the water which is later used to adjust sorbitol content of product to 70%. The

70% aqueous solution of high-purity sorbitol is known as Sorbo®.



General view of ion exchange equipment in use at Atlas Powder

**Results:** Ion exchange operation produces pure, water-white sorbitol, which is entirely suitable for use in foods and pharmaceuticals. Although specifications call for a maximum of 5 ppm iron and 5 ppm nickel, these metals are usually reduced to about 1 ppm. Chlorides and sulfates are also eff-

ectively removed. Product is essentially neutral.

(Ion exchange equipment is manufactured by the Permutit Co., Dept. CP, 330 W. 42nd St., New York 36, N. Y. . . or for more information check CP 6073 on handy form opposite last page.)

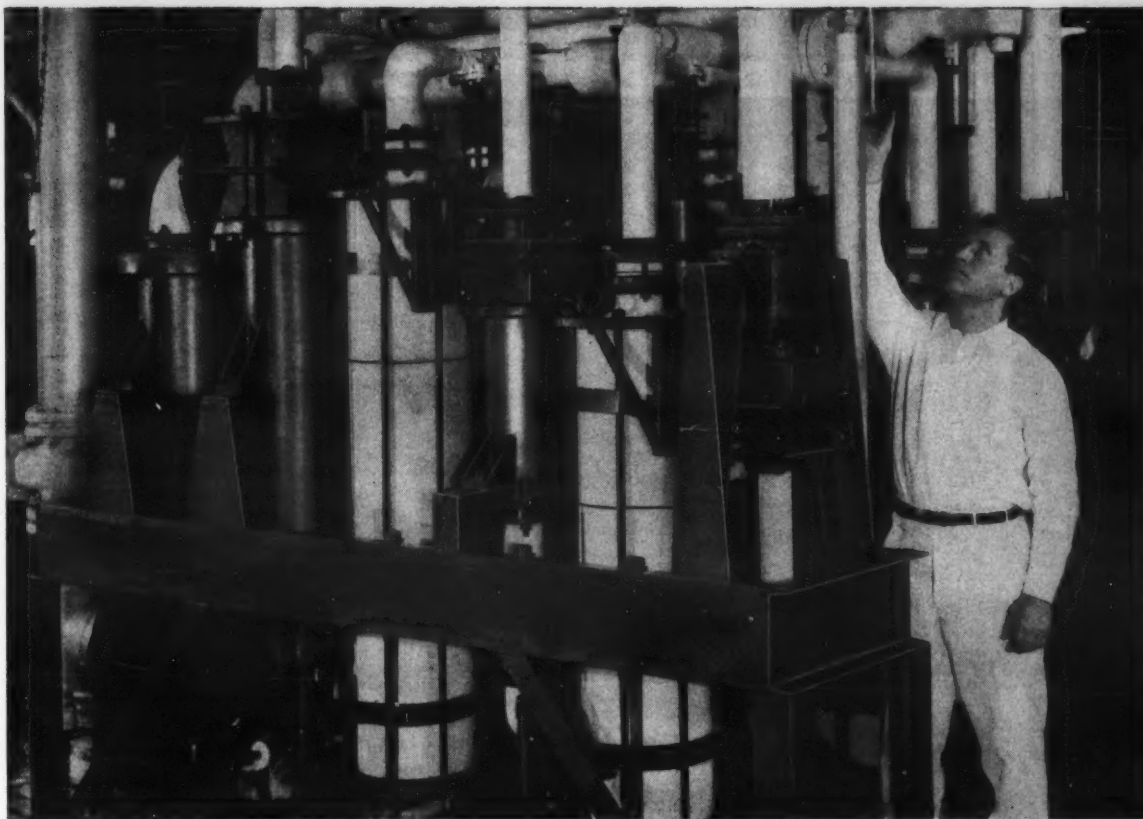
#### Compressor maintenance costs cut by wire mesh sections

How maintenance costs were reduced on propane compressors at a Gulf Coast refinery by installing monel wire mesh section in compressor suction drum of deasphalting unit, is explained in four-page pamphlet.

Similar case history is presented on use of wire mesh section in compressor suction line of cracking unit at a Midwest refinery. Accounts detail operating conditions before and after, as well as descriptions of sections used.

"Case Studies 1005 and 1006" is issued by Otto H. York Company, Inc., Dept. CP, 6 Central Avenue, West Orange, N. J. . . or for more information check CP 6074 on handy form opposite last page.

Processing and Engineering Data this month brings you information about *chemical materials* . . . you may want to clip it to save with the chemical materials feature. See page 72.



FOUR-STAGE WORTHINGTON STEAM JET EJECTORS of impervious graphite, with two porcelain barometric intercondensers at Pfizer plant. Ejectors are used to maintain vacuum in vitamin A synthesis.

## Worthington steam jet ejectors maintain vacuum under corrosive vapor attack at Pfizer

Exhibit A in the case for Worthington steam jet ejectors is this installation at Chas. Pfizer & Co. plant in Groton, Conn.

Two years ago these Worthington units replaced rotary vacuum pumps assigned to maintaining a steady vacuum for a distillation process in the manufacture of synthetic vitamin A. This constant vacuum of 1 mm (equal to 0.04 inches of mercury) must be held for two days, the period of processing. When corrosive vapors showed up unexpectedly in the process, the rotary vacuum pumps just couldn't take it. These vapors have no effect, however, on the Worthington ejectors which

are designed specifically to function reliably under the toughest kind of corrosive conditions.

Maybe your product is corrosive; maybe it isn't. But if you need a vacuum from atmosphere to 50 microns absolute, take a long look at Worthington's comprehensive line of steam jet ejectors which use regular plant steam. They're low in first cost, and their operating and maintenance expenses are practically non-existent — no moving parts. You can specify them in stainless, bronze, porcelain, impervious graphite, Worthite, cast iron or steel. Write Worthington Corporation, Steam Power Division, Ejector Section X.3.2, Harrison, New Jersey.

X.3.2

# WORTHINGTON



Steam Jet Ejectors • Gas Compressors • Chemical Pumps • Industrial Mixers • Refrigeration Equipment

When inquiring check CP 6075 opposite last page

An example of BUFLOVAK Forced Circulation and V.R.C. (Vertical Rapid Concentration) Evaporator. This one is used for concentrating a citrus by-product.

An example of BUFLOVAK Natural Circulation Type Evaporator. This is a Quadruple Effect used to concentrate a food product. Automatically controlled.



# WHICH ONE?

## each evaporator problem has one best answer



BUFLOVAK catalogs have a wealth of valuable information for you on drying, evaporation and processing. A request on your company letterhead will bring copies to you.

If you have an evaporator problem it must be treated individually . . . if you want the most profitable return on your invested dollars.

BUFLOVAK Vertical Rapid Concentration Evaporators provide high rates of evaporation, maximum recovery of solids, with simple, easy operation. You can pre-test in the BUFLOVAK Testing Laboratory in order to be doubly sure. Your engineers and ours do the testing, or we do it for you. Recommendations follow, based squarely on the results obtained.

BUFLOVAK V.R.C. Evaporators offer many operating advantages in concen-

trating liquids which do not precipitate crystals during concentration. Particularly, heat-sensitive materials, foamy liquids, and products requiring sanitary operation. Other types of BUFLOVAK Evaporators are available also, to serve every industry where liquids must be concentrated.

All BUFLOVAK equipment is designed, built, guaranteed and serviced by BUFLOVAK. Every manufacturing operation is performed in our own shops. We're ready to help you with your processing problems, regardless of the nature of the product or the result desired.

**THE BUFLOVAK ANSWER**  
is based on lowest overall operating cost

**BLAW-KNOX COMPANY**

BUFLOVAK EQUIPMENT DIVISION  
1645 Fillmore Avenue, Buffalo 11, New York



When inquiring check CP 6076 opposite last page

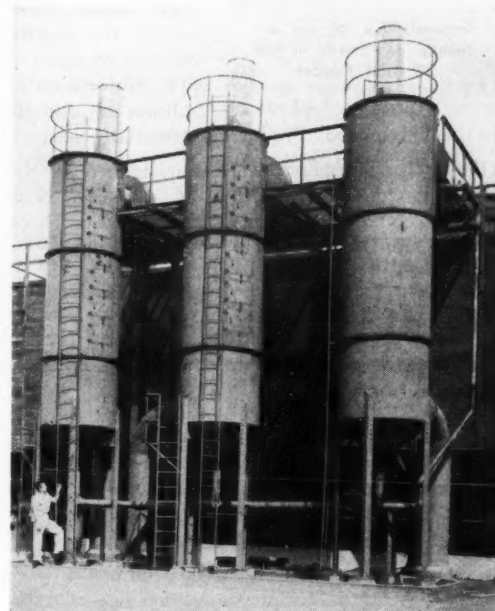
## NEW SOLUTIONS of processing problems

### Dust, fumes, and odors controlled by trio of multiwash collectors in antibiotic processing . . .

Abbott Labs had imposed stringent requirements to protect adjacent residential area

**Problem:** Dust, fumes, and odors formed in air drying filter cake, a by-product of penicillin production, had to be trapped before drying air was exhausted to the atmosphere from the antibiotic manufacturing unit of Abbott Laboratories, North Chicago, Illinois.

**Solution:** Three Type HC Multi-Wash dust and fume collectors were installed as part of plant's original equipment. Collector trio treats 24 to 29 thousand cu ft of air from the dryers every minute.

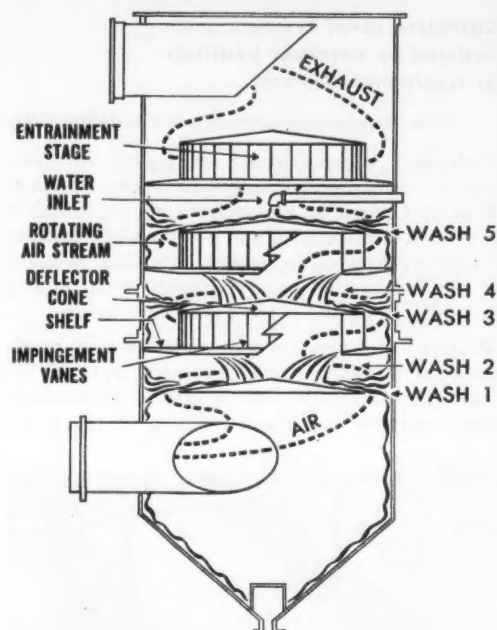


Collectors handle 24-29,000 cfm of air from dryers

Dust, fume, and odor-laden air enters collector tangentially through duct beneath lowest impingement plate into cone-shaped bottom. This serves as a wet cyclone, collecting heavier particles. Air is formed into a vortex which throws finer particles against wetted surfaces. This initial rotary motion is further enhanced by curved vanes at each impingement stage, and the air rises spirally through the tower.

There are 6½ impingement stages within each collector. An entrainment separator which frees outgoing air of excess moisture is above these stages, forming a seventh tier. Slightly alkaline wash water enters at center of top impingement plate. Rotary motion of ascending air sets up a similar motion in the falling liquid, causing it to be cascaded evenly as it flows downward by gravity.





Flow diagram shows how collector works (Abbott's three units have four additional impingement stages each, giving eight more washes)

A combination of water curtain, spray, and impingement action traps particles rising with the air and carries them down and out of the collector. Recirculation rate is about five gallons per thousand cfm of air.

**Results:** Collectors have been in this service for about five years. During this period they have satisfactorily removed dust, fumes, and odors from the dryer, and have met the stringent requirements imposed by Abbott to protect the adjacent residential area. Due to the non-clogging nature of the design and the fact that there are no moving parts, maintenance on the collectors has been negligible.

(Wet dust collectors are a product of Claude B. Schneible Co., Dept. CP, P. O. Box 81, North End Station, Detroit 2, Mich. Check CP 6077 opposite last page.)

#### Discusses economic aspects of white water treatment

Economic aspects of white water treatment in pulp and paper mills are described in eight-page report. Complete with illustrations, article discusses methods of treatment, and equipment used.

Technical reprint T-122 is issued by Graver Water Conditioning Company, A Division of Graver Tank and Manufacturing Company, Inc., Dept. CP, 216 West 14th Street, New York 11, New York. Specify CP 6078 opposite last page.

## For the business man who refuses to stagnate



**H**ALF the world is half asleep! Men who could be making *twice* their present salaries are coasting along, hoping for promotions but doing nothing to bring themselves forcefully to the attention of management.

They're *wasting* the most fruitful years of their business lives . . . throwing away thousands of dollars they may never be able to make up. And, oddly enough, they don't realize—even remotely—the tragic consequences of their failure to forge ahead while time is still on their side.

These are the men who are unknowingly headed for the frustrations and the disappointments of mediocrity. They'll go part way up the ladder and down again by the time they're fifty years old. They'll be executive material in their twenties and thirties—and clerks in their fifties. They'll have high hopes for themselves and their families while they're young; but only struggling, skimping and regret later on when their earning power should be at its height.

#### Send for Your Free Copy of "Forging Ahead in Business"

If you want to discover how to succeed while you are still young—if you want to avoid the heartbreak of failure in later years—send today for "Forging Ahead in Business" . . . one of the most practical and realistic booklets ever written on the problems of personal advancement.

Here you will find—not a "pep talk," not an academic lecture—but cold, hard facts on how to improve your position and increase your income. You will be told what the qualifications of an executive are in today's competitive market . . . what you must *know* to make \$15,000, \$20,000 or more a year . . . what you must do to accumulate this knowledge.

"Forging Ahead in Business" was written for mature, ambitious men who seriously want to get down to bed-rock in their thinking about their business future. If you feel it is meant for you, simply fill in and return this coupon. Your complimentary copy will be mailed to you promptly.



Mail  
Coupon  
Now!

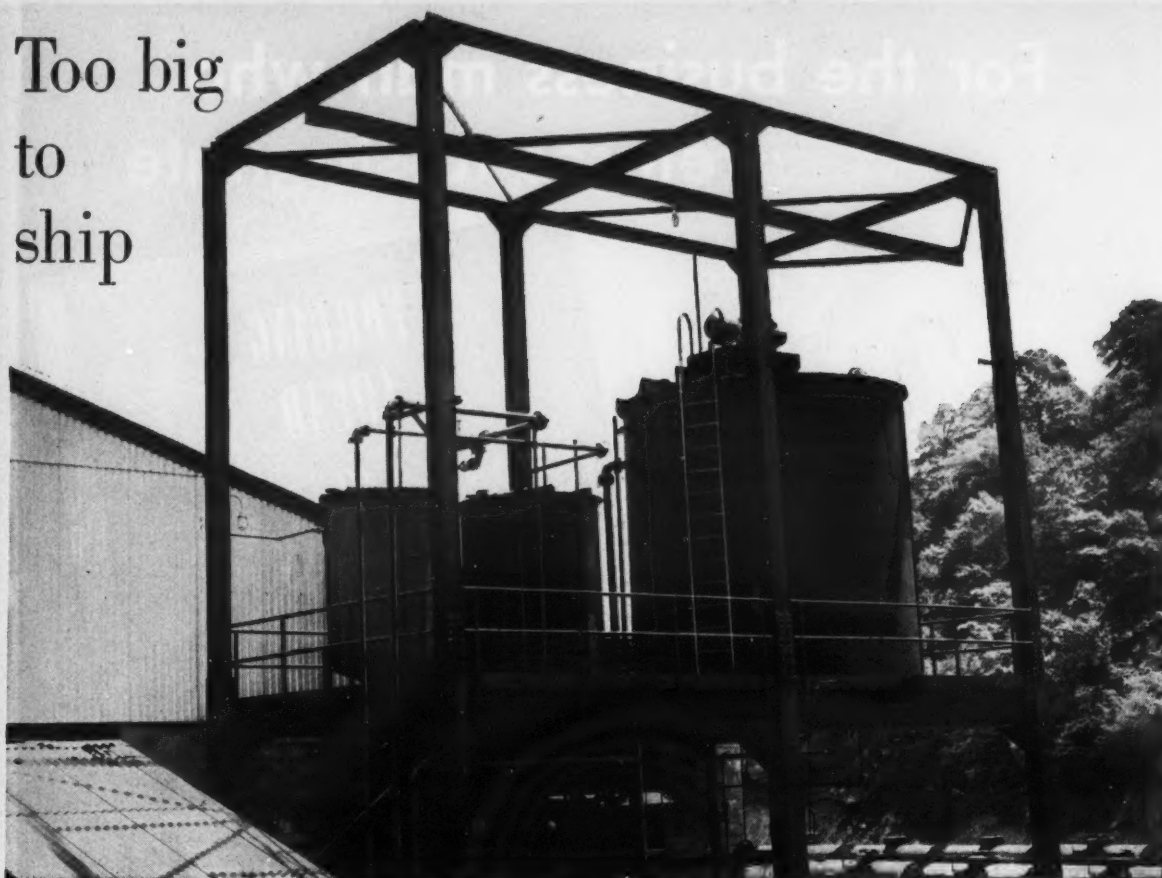
**ALEXANDER HAMILTON INSTITUTE**  
Dept. 336, 71 W. 23rd Street, New York 10, N. Y.  
In Canada: 57 Bloor St., W., Toronto, Ontario, Canada  
Please Mail Me, Without Cost, a Copy of Your 48-Page Book—  
**"FORGING AHEAD IN BUSINESS"**

Name.....  
Firm Name.....  
Business Address.....  
Position.....  
Home Address.....

When inquiring check CP 6079 opposite last page



Too big  
to  
ship



so U.S. Permabond® protective linings were installed on the spot

EQUIPMENT requiring protection against corrosive attack can be lined with Permabond linings—right in your own plant. The above storage tanks in a chemical plant, for example, were too big to be shipped. So United States Rubber Company's Permabond Lining was installed and vulcanized right at the job site—insuring complete protection against the corrosive chemicals stored in the tanks.

This is one more example of the versatility and adaptability of the Permabond process. You can also have it installed as original equipment on anything that contains or conveys corrosive materials and chemicals—piping, tanks, valves. And where special conditions occur, a wide range of synthetic Permabond lining stocks is available. Write to the address below.

**"U. S." Research perfects it.**

**"U. S." Production builds it.**

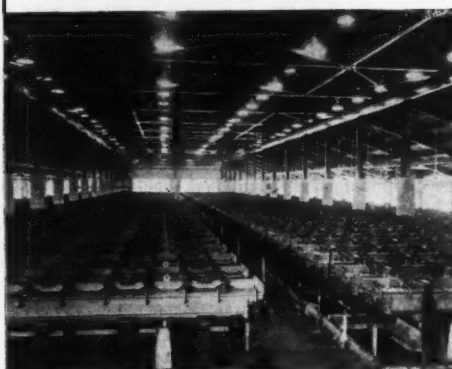
**U. S. Industry depends on it.**



**UNITED STATES RUBBER COMPANY**  
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes  
Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

These hundreds of electrolytic mercury cells producing caustic soda and chlorine are lined with specially compounded Permabond hard rubber lining.



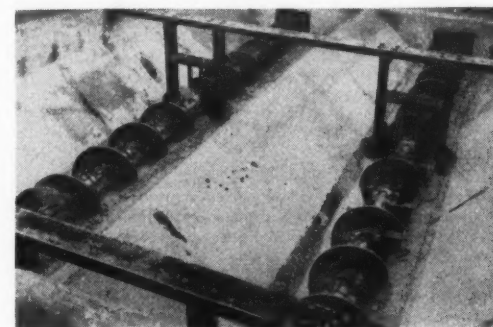
## NEW SOLUTIONS of processing problems

### Corrosive spent brewers grain resisted by conveyor bearings of impregnated wood . . .

they require no lubrication, last three years

**Problem:** Requirements are rugged for bearings on conveyors handling spent brewers grain at Walters Grain Co., Philadelphia. Grain, which is processed to make cattle and poultry feeds, contains a high percentage of corrosive lactic acid. When it is handled by the screw conveyors, grain is at a temperature of about 180°F and very moist.

Walters had no success with several bearing materials for standard screw conveyors. Bearing life was unsatisfactory because of lack of resistance to heat, corrosive and abrasive action of the grain,



Trucks dump hot, moist, spent brewers grain into this concrete pit. Grain is so corrosive that screw conveyors are made of heavy cast iron and pit itself must be re-cemented every six months. Impregnated wood hanger bearings (arrows) last for three years

and to extra load imposed by cast iron conveyor flights. A further difficulty was presented by the fact that bearings in this application should require no lubrication because of contamination and maintenance problems involved.

**Solution:** Walters installed impregnated wood hanger bearings on the conveyors. These bearings are made of a very hard wood of the maple family found in South America. They are completely impregnated with a combination of waxes and greases which remains solid at normal temperatures, but flows when heated by friction. Lubricant will not oxidize up to 180°F. Bearings retain lubricating qualities indefinitely since lubricant doesn't drip and is drawn back into wood as bearing cools.

**Results:** This type of impregnated wood hanger bearings has a three-year service life in this severe application. No lubrication or other maintenance of bearings is necessary. Product contamination due to lubrication-drip or bearing breakdown under corrosive conditions is eliminated.

(Oilless wood bearings are a product of Arguto Oilless Bearing Company, Dept. CP, 149 Berkley St., Philadelphia 44, Pa. . . or for more information check CP 6081 on form opposite last page.)

Dr. S.  
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"... complete cooperation between commercial chemical development and the chemical press is vital to the continuing growth of the thriving chemical industry ..."

**NOLAN B. SOMMER**  
President, Commercial Chemical  
Development Association



## the "new look" in chemical marketing

Dr. Sommer received his B.Sc. in 1941 from the Univ. of Nebraska, and an M.A. in organic chemistry from that institution in 1942. He earned his Ph.D. from Indiana Univ. in 1944. His first employment was with Stamford Laboratories of American Cyanamid Co. as a research chemist. In 1947 Dr. Sommer engaged in market development work for Jefferson Chemical Co., Inc., becoming Manager of the Market Development Div. in 1951. Since his return to American Cyanamid in 1952, he has been Manager of the New Product Development Department.

Among many memberships, Dr. Sommer includes the CCDA, ACS, Amer. Inst. of Chemists, and the Soc. of Chem. Ind. As a member of the CCDA, Dr. Sommer has served as Treasurer, President-elect, and is now President of this Association.

Only in recent years has the chemical industry recognized that area between research and development and sales as a separate entity on the organization chart. This recognition has ended market development by the non-technical old-time salesman. It has ushered into the company structure new, highly-trained groups whose job it is to turn laboratory products into successful articles of commerce. Under the name "commercial chemical development" or "market development", these groups have already become instrumental in the business of increasing the profit dollar, while decreasing average time required to transpose laboratory chemicals into profitable products.

A manifestation of the growing importance of this phase of companies' operations has been the creation in the last decade of important market associations such as the Commercial Chemical Development Associ-

ation and the Chemical Market Research Association. These organizations provide the opportunity for a broader acquaintance in the industry and for valuable exchange of ideas and techniques in marketing.

An important outgrowth of this "new look" in chemical marketing has been better organized new product introduction, with liberal offerings of samples and technical literature. Commercial development people are constantly striving for prompt and thorough sample evaluation by all phases of our industry. Unfortunately, a problem exists in that many pounds of expensive new products are virtually wasted through careless sampling and follow-up procedures. Likewise, another problem is receipt of the "early word" on availability of new products constantly sought by chemical research.

Complete solution to these two problems has still not been reached. However, with several years of experience behind us, we have made considerable progress toward that goal. As part of this effort, the chemical press has cooperated very effectively in drawing the attention of its readers to new materials. An example of this cooperation is this featured Materials section of CHEMICAL PROCESSING.

With proper nourishment in the form of a continuing flow of good new products, there is little doubt that our thriving young industry can gain a maturity which will place it in the vanguard of our country's progress. A continuing spirit of complete cooperation between commercial chemical development and the chemical press is vital to the attainment of this objective.



Starts here — fifty-seven pages spotlighting

# chemical materials

For this issue our regular "Materials" section has been expanded to make room for some extra features. Here are some of the things you'll find:

- 1) **CHEMICAL MATERIALS INTRODUCED IN 1954** —  
A 36 page alphabetical listing with properties, purity, features .....Page 30
- 2) **"USE-INDEX" of These Materials**—Cross-indexed  
with the product listing .....Page 80
- 3) **REFERENCE DATA**—Including a nomograph for quick  
determination of vapor pressures for compounds .....Page 72
- 4) **ALPHABETICAL LIST of Chemical Manufacturers**—  
so you can follow-up on products which  
interest you .....Page 82
- 5) **Acrylonitrile and Derivatives** — a concise  
summary of properties, uses of some of the  
more important compounds .....Page 48



# new chemical materials



Here is a listing of chemical materials introduced in 1954 as new products of companies whose names appear at the end of each item. List, based on information received up to deadline, is alphabetized according to either common name or Geneva Convention nomenclature, insofar as possible.

If you want more information on any of these items, contact the manufacturer. See page 82 for company addresses.

1) **ACETOACET-*m*-XYLIDIDE** — For preparation of Hansa and benzidine yellow pigments of improved light stability.  $(CH_3)_2C_6H_3NHCOCH_2COCH_3$ . Melts: 89-90°. Sl. sol: water. Union Carbide.

2) **ACRYLIC COPOLYMER EMULSION** — Polycy A-15 is used as a pigment binder, sealer in leather industry. Has permanent flexibility, high plating temp, good low temp flex, formulation of bright, continuous films which are water-repellent. Borden Co.

3) **ACRYLIC EMULSION** — Ubatol U-3010, modified acrylic emulsion of extreme fine particle size, imparts water-resistance to films. Used in leather finishing, latex paint, paper coating. Union Bay State Chem.

4) **ADHESIVE** — Bondmaster M650 is designed to bond Styrofoam to wood, glass, metal, plastic surfaces without adversely affecting the surface. Low-temp curing, two-part, solvent-dispersed, flexibilized, epoxy-based adhesive. Rubber & Asbestos Corp.

5) **ADIPIC ACID** — 99.6% min purity. For fibers, plasticizers, lubricants, elastomers. Typical MP: 152.2°. National Aniline.

6) **ALCOHOL PHTHALATE PLASTICIZER** — Flexol 426 is a mixed alcohol phthalate primary plasticizer—for vinyl chloride resins and nitrocellulose lacquers. Low volume cost, good solvent power for vinyl chloride resins. Excellent heat, light stability. Good electrical, low-temp properties. Water-extraction resistance. Excellent permanence and color retention in nitrocellulose lacquers. BP: 224° @ 5 mm. Toxicity: low. Union Carbide.

7) **ALIPHATIC KETONES** — Stearone, laurone, and oleone. Each is tech grade. Stearone melts at 80°, is 97% ketone. Laurone melts at 69°, is 96% ketone. Oleone melts at 28°, is 91% ketone. Insol: water. Sl. sol: organics. Uses: extrusion aids, paper coatings, adhesives, lubricants, anti-block and release agents. Unaffected by high temp, acids, alkalis; compatible with waxes, triglycerides, fatty acids. Undergo reactions of carbonyl group. Armour.

8) **n-ALKENES** — 11-Tricosene and 17-pentatriacontene,  $C_{23}$  and  $C_{25}$  respectively, for chemical syntheses. For polymer recipes, special solvents, lubricants. Purity: 95%. BP: 168-170° and 197-200°, respectively, @ 2.5 mm. Both mixtures of *trans*, *cis* isomers. Exp. Armour Res.

9) **ALKYD RESIN SOLUTION** — Burnok 4040 long oil alkyd imparts thixotropy to oil-base paints. It is used as a vehicle for enamel and semi-gloss paints, and gelled paints. Soluble in naphtha. Washburn.

10) **ALKYL ARYL SODIUM SULFONATE** — Nacconol SL, a clear, pale yellow, free-flowing liquid. General wetting agent, detergent for textiles, leather, paper. Makes proprietary cleaners for industry, households. Faint, pleasant odor. Excellent wetting properties. Haze point of 32°F. 35% (min) active organic content. National Aniline.

11) **ALKYL ARYL SODIUM SULFONATE** — Udet has 95% purity. High-active liquid detergent, free-flowing. Universal Detergent Inc.

12) **ALKYL ARYL SODIUM SULFONATE** — 98% pure. Petro AA is used for cooking pulp, and as surface-active agent in acids, alkalis where it is sol, stable. Universal Detergent, Inc.

13) **ALKYL HALIDES** — Myristyl chloride, cetyl chloride, stearyl chloride, and corresponding bromides; along with decyl bromide and lauryl bromide are in series of alkyl halides. Tech grade is satisfactory for most applications, such as quaternary ammonium compounds. Distillation gives purer compound if needed. Aceto Chem. Co.

14) **N-ALKYL MORPHOLINES** —  $R-NC_4H_8OC_2H_5$ , where "R" is derived from either coco or tallow. Tech. Uses: antistatic agents, corrosion inhibitors, flotation reagents, surface-active agents, intermediates for salt-free quaternaries. In paper, textile, wax, water treating, agricultural chemical fields. Pilot plant quan. Armour.

15) **ALKYL PHENYL POLYETHYLENE GLYCOL ETHER** — Sulfanole NO-9, a wetting agent, is used in dyeing and finishing of textiles and in cleaners. Water-soluble, it is of 95% min purity. Warwick Chem.

16) **ALKYLANILINE** — Alkylaniline C-12 has formula  $C_{12}H_{15}.C_6H_5NH_2$ . BP: 295-345°. Intermediate. Reacts similarly to alkydaniline C-5. Exp. Monsanto.

17) **ALKYLANILINES** — A liquid with general formula  $R-C_6H_4NH_2$ , alkydaniline C-5 boils from 250-280°C. With aldehydes, forms Schiff bases from which secondary amines and nitrile derivatives may be obtained. Precursor for isocyanate, thiourea derivatives. Exp. Monsanto.

18) **ALLETHRIN DERIVATIVES** — Possible syntheses: pharmaceuticals, perfumes, insecticides, fine chemicals. Available are allyl acetone; 2,5-dimethyl-2,5-diol; 2,5-dimethyl-2,4-hexadiene; ethyl- $\alpha$ -allylacetate; ethyl diazoacetate. Nat'l Dist. Prod.

19) **ALUMINA** — Alcon C is composed of well-defined particles of extreme fineness, consists predominantly of the gamma modification. Purity is 95% (min). High external surface, ease of dispersion. Used as reinforcing agent for silicone, butyl, cold GR-S, and natural rubbers. Other uses include: abrasives, textiles, ceramics, catalyst carrier. G. L. Cabot.

20) **ALUMINA** — For dehumidification of gases, defluorination of alkylate stream after HF alkylation, decolorization of wax, as catalyst carrier. Has high break-point, low abrasion loss, high crushing strength, economical. Filtrol.

21) **ALUMINUM NITRATE** — For use by atomic research groups, this reagent has lowest uranium impurity (0.0000001%) of any available product for fluorimetric analysis of uranium.  $Al(NO_3)_3$  melts at 73°C. Fisher.

22) **ALUMINUM POLYPHOSPHATE** —  $5Al_2O_3.9P_2O_5.nH_2O$ . Tech. Conditioning agent, catalyst. Particle size  $<5\mu$ , with most  $<1\mu$ . Insol: water. Victor Chem. Works.

23) **AMINE ALKYL ARYL SULFONATE** — Ninat 411 is 90%-active, oil-soluble. Emulsifier for solvent degreasers, fuel oil tanks, and so forth. Synthetic replacement for mahogany sulfonates. Combines excellent detergency with emulsifying action. Ninol Labs.

24) ***m*-AMINE PHENYL METHYL CARBINOL** — Use: making dyestuffs, pharmaceuticals. BP: 217.3° @ 100 mm. Freezes: 66.4°. Sol in water: 36% @ 25°.  $NH_2C_6H_4[CH(OH)CH_3]$ . Union Carbide.

25) **AMINOHYDROXY COMPOUNDS** — For making resins, pharmaceuticals, dyestuffs, photographic developers, textile specialties, drying oils. Saponification with higher fatty alcohols makes strong emulsifiers. 2-Amino-2-methyl-1-propanol, 2-amino-2-methyl-1,3-propanediol, and tris(hydroxymethyl) aminomethane are available commercially. 2-Amino-1-butanol and 2-aminoethyl-1,3-propanediol are exp. Commercial Solv.

26) **AMMONIUM PETRONATE** — Suggested for use as a rust and corrosion inhibitor in light hydrocarbon distillate systems. Compound is ammonium salt of a petroleum sulfonic acid. Assays 44% sulfonate, 53% mineral oil, 3% water, trace of inorganic salts, no ash. Mw: 442. Sonneborn Sons.

27) **AMMONIUM PICRATE** — Pure. Exp. City Chem.

## unless otherwise specified . . .

- 1) Commercial quantities are available ("Exp." indicates otherwise)
- 2) Pressures are in mm of mercury (abs.)
- 3) Boiling points are at 760 mm
- 4) Temp is in °C
- 5) Solubilities are at "room temp"



In looking for materials for specific uses, you'll find it more convenient to first see our "Use-index", page 80, which is cross-indexed with this list. Find what you want there, then check the item numbers in this list.

28) **ANALYTICAL GRADE ION EXCHANGE RESIN** — Requires no preprocessing for pharmaceutical, other uses including purification and preparation of biochemicals, organics, radioactive isotopes. Acid catalyst in organic reactions. Resin is a sulfonated, aminated divinylbenzene-polystyrene. Bio-Rad.

29) **ANHYDROUS AMMONIA** — For synthetic fibers, plastics, explosives, fertilizers. Atlantic Ref.

30) **ANILINE** — 99.8% min purity. Max color (Barrett Std.): 1. Nitrobenzene content <5 ppm. Intermediate to make acetanilide, benzoquinone, hydroquinone, phenyl isocyanate, azo dyestuffs, pharmaceuticals. BP: 184-184.8°. National Aniline.

31) **ANILINE PHOSPHATE** —  $(C_6H_5NH_2)_3HPO_4$ . Pure. Exp. City Chem. Corp.

32) **ANIMAL PROTEIN** — New Process glue is colloidal water-sol. animal protein. Flocculent retains  $TiO_2$  and clay at high uniform level in papermaking and for flotation saveall systems. Swift-Ad. Prod.

33) **ANION EXCHANGE RESIN** — A strong-base anion exchanger, Duolite ES-103 is used in general ion exchange applications, weak acid removal. Resin has high porosity, chemical and physical stability. Exp. Chemical Process Co.

34) **ANTIFOAM AGENT** — Nalco 71-Lx. Controls foam, bubble formation, carryover in synthetic latex manufacture. Min pre-floccing. Amber-colored liquid. Dosage: 0.05-0.15%. Nat'l Aluminate.

35) **ANTIOXIDANT** — Antioxidant D has purity of 93-95%. Boils at 204°; melts at 88°. Antiskinning agent for paints, varnishes, enamels. National Aniline.

36) **ANTISKINNING AGENT** — Exkin No. 3 has low odor, high volatility, efficiency. BP: 88°. Sol: mineral spirits, aromatics. Purity: 99% min. Nuodex.

37) **ANTISTATIC AGENT** — Niatex Antistatic Agent AG-1 is available in semi-commercial quantities. 40% aq. soln of a vinyl-type monomer. Solidifies at 20°F. On synthetic fibers, gives lasting antistatic protection, has little or no effect on hand, can be applied with shrink-resistant and water-repellent finishes. Union Carbide.

38) **ANTISTATIC AGENT** — With synthetic fibers, Antistatic Agent 20 is also a good emulsifier. Supplied in many viscosities. Sol: most organics. Victor Chem.

39) **ANTISTATIC AGENTS** — Electrosols find use as antistatic agents; stabilizers for polyvinyl chloride. Both solids and liquids are in series. Purity: 100%. Sol: common solvents. Nontoxic. Alframine.

40) **ARSENIC TRIIODIDE** — Three grades: tech, pure, NF VIII. Poisonous. Exp. City Chem. Corp.

41) **L-ASPARAGINE MONOHYDRATE** — Optically standardized, crystalline, for biochemical and nutritional research.  $C_4H_8O_5N_2 \cdot H_2O$ . Schwarz Labs.

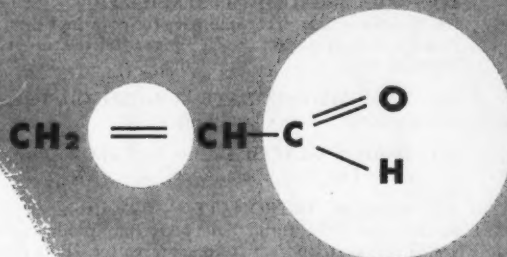
42) **D-ASPARTIC ACID** — Optically standardized for biochemical, nutritional research. Schwarz Labs.

43) **AZELAIC ACID** — Emerox 1110 is 87% azelaic acid, 13% other dibasic acids. MP: 95-99°. Acid value: 565. Raw material for resins, plasticizers, alkyd resins, synthetic lubricants. Emery Ind.

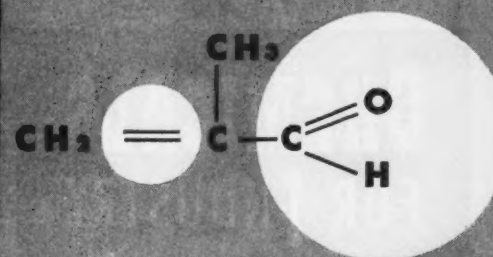
(Continued on next page)

## THESE REACTIVE INTERMEDIATES...

Acrolein



Methacrolein



Mean Business...

IN ★ pharmaceuticals

★ dye intermediates

★ odorants

★ amino acids

★ resins for textiles, paper, linoleum, and adhesives

★ copolymers with acrylonitrile, acrylic esters, butadiene, and styrene

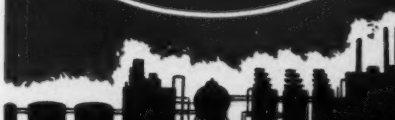
Because of the reactivity of their aldehyde and ethylenic groups, acrolein and methacrolein can lead the way to an almost unlimited number of products. You can react the ethylenic group with halogens, halogen acids, 1, 3-dienes, alcohols, and mercaptans—the aldehyde group with anhydrides, Grignard reagents, alcohols, and HCN. To increase the possibilities still further, under the proper conditions the aldehyde and ethylenic groups will react either individually or simultaneously.


Reactions already reported include: for acrolein, preparation of the amino acids methionine and lysine, 2-amino pyrimidine, folic acid, substituted quinolines, benzanthrone, odorants by Diels-Alder condensations with butadiene and substituted butadienes, and coating resins by reaction with urea, thiourea, and polyhydric compounds—for methacrolein, copolymers with high softening points and good solvent resistance, and resins for impregnating fabrics, linoleum, and adhesives.

Write

the nearest CARBIDE office for samples and further information so that you can investigate them in your own laboratories. In Canada: Carbide Chemicals Sales Company, Division of Union Carbide Canada Limited, Toronto.

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AND CARBON  
CHEMICALS**



Carbide and Carbon Chemicals Company  
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When inquiring check CP 6082 opposite last page



## CHEMICALS FOR INDUSTRY

Uniform quality . . . The key to the superior Chemicals for industry produced by the Tennessee Corporation. As basic producers, we maintain exacting quality control from the raw materials to the finished product that bears our label.



COPPER SULFATE	MANGANOUS OXIDE
MONOHYDRATED COPPER SULFATE	MANGANESE CARBONATE
COPPER CARBONATE	FERRIC SULFATE
COPPER HYDRATE	SULFUR DIOXIDE
CUPRIC CHLORIDE	MONOHYDRATED ZINC SULFATE
CUPRIC OXIDE	CHLOROSULFONIC ACID
MANGANESE SULFATE	ORGANIC SULFONIC ACIDS (AND DERIVATIVES)
MONOHYDRATED MANGANESE SULFATE	

Samples, Specifications and Detailed Information Available Upon Request.

TENNESSEE **TC** CORPORATION

617-629 Grant Building, Atlanta, Georgia

## new chemical materials

nos. 44 to 84

(Continued from preceding page)

- 44) **BARIUM-CADMIUM STABILIZER** — Stabelan HR Powder is heat, light stabilizer for polyvinyl chloride. Powder, liquid forms. Ba-Cd mixed fatty acid esters. Harwick Std.
- 45) **BARIUM GLUCONATE** —  $\text{Ba}(\text{C}_6\text{H}_{11}\text{O}_7)_2$  Tech, CP. Sol: water. Exp. City Chem. Corp.
- 46) **BARIUM GLYCOLATE** —  $\text{Ba}(\text{C}_2\text{H}_4\text{O}_4)_2$  Tech, CP. Sol: water. Exp. City Chem. Corp.
- 47) **BARIUM PETRONATE** — Available in both neutral and basic form. Sol: petroleum products. Suggested as rust and corrosion preventive. Both forms contain 51% Ba sulfonate complex, and 48.5% mineral oil. Mw (as Na salt): 445. Base No. is zero for neutral form, 45 mg KOH/gm for basic. Sonneborn Sons.
- 48) **BEHENIC ACID** — High MP (76-78°) is of interest to cosmetic formulators. White, wax-like solid acid has been specially distilled to obtain maximum  $\text{C}_{22}$  content. Average composition of acid: behenic acid 90%, stearic acid 8%, unsaponifiable 2%. Mean mw: 335-340. Aceto Chem Co.
- 49) **BEHENYL ALCOHOL** — Adol 60 is 85%-pure  $\text{C}_{22}\text{H}_{46}\text{OH}$ . Intermediate for lubricants, textile applications, surface-active agents. Boiling range: 342-377°. Melts at 62.6°. Exp. A-D-M.
- 50) **BENZALACETOPHENONE** —  $\text{C}_{15}\text{H}_{12}\text{O}$ , 98% min. BP: 175° @ 2 mm. MP: 51-57°. Makes pharmaceuticals, other organics. Yellow crystals or flakes. Trubek Labs.
- 51) **BENZENE** — Nitration grade has 99.6% purity. BP: 80.1°. Intermediate for organic compounds for use in plastics, nylon, synthetic detergents, insecticides. Thiophene-free. Sun Oil.
- 52) **BENZHYDROXYLAMINE** — 98% (min)  $\text{C}_{10}\text{H}_{12}\text{N}$ . BP: 135° @ 1 mm. Pharmaceutical making. Trubek Labs.
- 53) **BENZHYDRYL CHLORIDE** — 98% (min)  $\text{C}_{10}\text{H}_{11}\text{Cl}$ . BP: 140° @ 3 mm. MP: 17°. Light color to white. For pharmaceuticals. Trubek Labs.
- 54)  **$\beta$ -BENZOYL ACRYLIC ACID** — Resin intermediate. Ovicide for body louse eggs. Shows bactericidal, fungicidal activity. Exp.  $\text{C}_{10}\text{H}_8\text{O}_4$ . 99% pure. Melts: 93.5°. National Aniline.
- 55) **BENZYL MERCAPTAN** — Introduces benzyl sulfide groups into structure of various organic compounds. Purity: 95%. BP: 194.8°C. No specific toxicity tests made, but should behave as other mercaptans. Sol: alcohols, benzene, ketones, dioxane. Exp. Thiokol Chem.
- 56) **BIS( $\beta$ -CHLOROETHYL) VINYL PHOSPHONATE** — Boils at 132° @ 1 mm.  $(\text{ClC}_2\text{H}_4\text{O})_2\text{P}(\text{O})\text{C}_2\text{H}_5$  is comparatively stable in storage, will polymerize readily and copolymerize under proper conditions.  $\text{Br}_2$  will not add readily. Alcohols, mercaptans can be added with basic catalysts. Intermediate. Sl. sol: water. Sol: organics. Exp. Monsanto.
- 57) **1,4-BIS-[2-(5-PHENYLOXAZOLYL)]-BENZENE** — POPOP fluoresces in UV light producing 4200A wavelength. Shifts wavelength in liquid scintillation counting. Lab-scale. MP: 245-246°. Arapahoe Chem.
- 58) **2,3'-BITOLYLENE-4,4'-DIISOCYANATE** — Called TODI. Formula:  $[(\text{CH}_3)_2\text{C}_6\text{H}_3\text{OCN}]_2$ . Purity: 99.5% min.



MP: 71-72°. To make elastomers, foams, adhesives, fibers, other polymers. Reactivity with compounds having active hydrogen atom, particularly where low rate of reactivity is desired. Introductory quantities. National Aniline.

59) **BONDING AGENTS** — Bond almost all rubber and metals. Bonds cure over wide range, resist static shock and bending. Excellent stability, easy application. Can be used alone or as two-coat system. Ty-Ply UP is blue, free-flowing single phase liquid containing no dispersed solids. Ty-Ply RC is black, contains dispersed solids. Drying time: 30'. Marbon Corp.

60) **BORIC ACID ESTERS** — Nine organic boric acid esters are trimethyl borate  $(\text{CH}_3\text{O})_3\text{B}$ , tri-*n*-butyl borate  $(\text{C}_4\text{H}_9\text{O})_3\text{B}$ , tri-*n*-amyl borate  $(\text{C}_5\text{H}_{11}\text{O})_3\text{B}$ , tri-*n*-hexyl borate  $(\text{C}_6\text{H}_{13}\text{O})_3\text{B}$ , tri-*n*-octyl borate  $(\text{C}_8\text{H}_{17}\text{O})_3\text{B}$ , tri-*n*-dodecyl borate  $(\text{C}_{12}\text{H}_{25}\text{O})_3\text{B}$ , tri-hexylene-glycol diborate  $\text{C}_6\text{H}_{13}\text{O}_2\text{B}$ , tri-*o*-cresyl borate  $\text{C}_7\text{H}_9\text{O}_3\text{B}$ , and tri-(2-cyclohexylcyclohexyl) borate  $\text{C}_{12}\text{H}_{21}\text{O}_3\text{B}$ . Sol: organics. Hydrolyzes in water or moist air. Pacific Coast Borax.

61)  **$\beta$ -BROMOBUTYRIC ACID** —  $\text{C}_4\text{H}_7\text{O}_2\text{Br}$  of min purity: 95%. An untried intermediate. Exp. Dow Chem.

62) **1,2,4-BUTANETRIOL** — Humectant, plasticizer for cork, cellulose, acetate, cosmetics, textile printing, pastes, pharmaceuticals. Intermediate for trinitrobutane, an explosive. Component in alkyd and other resins.  $\text{HOC}_4\text{H}_8\text{OHCH}_2\text{CH}_2\text{OH}$  has 95% min purity. BP: 312°. LD<sub>50</sub>: 21 gm/kg. Exp. General Aniline—Com. Devel.

63) **BUTOLYLENEDIISOCYANATE** —  $[\text{OCN}(\text{CH}_2)_4\text{C}_6\text{H}_4]_2$ . TODI has 97% min purity. MP: 71-72°. BP: 180° @ 1.0 mm. Sol: aromatics. Makes rigid and flexible foams, elastomers, resins, fibers, adhesives. Exp. Carwin.

64) **2-*n*-BUTOXYETHYL ACETATE** — Used as a solvent for Au and Ag printing inks for printed circuit work in electronics. Purity: >99%. Called Butyl "cellosolve" Acetate,  $\text{C}_8\text{H}_{18}\text{O}_4$ . BP: 83-84° @ 15 mm. Miscible with most organics. Brothers Chem.

65) **N-BUTYL CYCLOHEXYLAMINE** —  $\text{C}_{10}\text{H}_{21}\text{N}$ . An alkaline organic solvent; extractant for acidic materials; acid acceptor. Makes pharmaceuticals, rubber chemicals, corrosion inhibitors. BP: 209.5°. Freezes: -45°. Union Carbide.

66) **BUTYL ISO DECYL PHTHALATE** — Elastex 40-P is 99.5%  $\text{C}_{22}\text{H}_{40}\text{O}_4$ . A secondary plasticizer in vinyls. Can be used as sole softening agent in vinyl formulations for cost-saving. Also used in plastisols, organosols. Barrett Division.

67) **BUTYL OLEATE** — Primary plasticizer, solvent for rubbers; secondary plasticizer for cellulose esters, polyvinyl resins; textile lubricant. Tech. Harwick Std.

68) **CADMIUM SELENATE** —  $\text{CdSeO}_4 \cdot 2\text{H}_2\text{O}$ . CP Sol: water. Exp. City Chem. Corp.

69) **CADIUM SELENITE** —  $\text{CdSeO}_3 \cdot 1/2\text{H}_2\text{O}$ . CP. Exp. City Chem. Corp.

70) **CALCIUM PETRONATE** — The Ca salt of a petroleum sulfonic acid; available in both neutral and basic forms. Base No. (neutral form): zero. For basic form: 23 mg KOH/gm. Mw (as Na salt): 445. % Ba in sulfonate complex: 13. Use: Corrosion preventive, preparation of water-in-oil emulsions. Sonneborn Sons.

When inquiring check CP 6083 opposite last page



- 71) **CALCIUM o-XYLENE SULFONATE** — Ca  $[(CH_3)_2C_6H_4SO_3]_2$ . CP. Sol: water. Exp. City Chem. Corp.
- 72) **CARBON BLACK** — Witcoblak No. 55 for printing inks, paint. A densed channel black. Witco Chem.
- 73) **CARBOXYLIC SYNTHETIC POLYMER** — Carbol 934 has extremely high thickening efficiency in aq. systems. Used as thickener, suspending agent for pharmaceuticals, cosmetics, industrial applications.  $LD_{50} > 40$  gm/kg. Viscosity governed by pH adjustment. Goodrich.
- 74) **CARBOXYMETHYL STARCHES** — CM Starches are Na salts of carboxymethyl ethers of starch. Three viscosity grades. Uses: beater additive, tub and calender sizing, paper coating, textile printing gums. Sol: cold water. Film-forming, imparts water-resistance. National Starch.
- 75) **CASTING WAX** — Superior molding characteristics at low cost are feature of Petrolite Wax PC-13. Solidifies: 160-170°F. MP (ring and ball): 190-195°F. 100% wax. Toxicity: Relatively nil. Petrolite Corp.
- 76) **CATION EXCHANGE RESIN** — Called Duolite C-25, resin is crosslinked polystyrene sulfonic acid cation exchanger. Use: water softening, demineralization, decationization of sugar-bearing liquids. Resin has high porosity, high rate of exchange. Chemical Process Co.
- 77) **CATIONIC ORGANIC PHOSPHATE** — Antistatic Agent A for synthetic fibers. Sol: most organics. MP: approx. 35°. Victor Chem. Works.
- 78) **CATIONIC RESIN FIXATIVE** — For direct dyes on cotton, rayon. Dextrafix B prevents migration, staining with prints; renders most direct dyes fast against mild soap washing. Dexter Chem.
- 79) **CELLULOSE ACETATE** — Developed for vacuum forming, S704 should find broad use in packaging items, similar applications. Celanese.
- 80) **CETYL PYRIDINIUM CHLORIDE** — Used as cationic surface-active agent and germicide. Sol: water, alcohol, chloroform. Melts at 78-82°. Fine Organics.
- 81) **CETYL TRIMETHYL AMMONIUM STEARATE** — Although not fully evaluated, it is suggested for use as poultry feed additive. Purity: >95%. Sol: hot alcohol. Decomposes on heating. Fine Organics.
- 82) **p-CHLOROBENZENESULFONYL CHLORIDE** — Intermediate.  $ClC_6H_4SO_2Cl$  reacts with alcohols, amines; undergoes reactions of sulfonyl chloride grouping. BP: 141° @ 15 mm. Exp. Monsanto.
- 83) **p-CHLOROBENZHYDRYL CHLORIDE** — >97%  $C_{12}H_{10}Cl_2$ . BP: 145° @ 3 mm. Makes pharmaceuticals. Trubek Labs.
- 84) **CHLOROCYCLOHEXANE** —  $C_6H_{11}Cl$ . Purity: 99+%. Intermediate, esp. pharmaceuticals. In Grignard reaction, yields better than with the bromide. BP: 141-143°. Arapahoe Chem.

(Continued on page 37)

Use-index for all these products starts on page 80. See it first if you're after a chemical material for a specific use. It's cross-indexed with this list.

Manufacturer address list starts on page 82. Use it when writing for more information on materials which interest you.

MATHIESON

POLY-SOLV

A remarkably versatile series of solvents, the POLY-SOLVs are now available in commercial quantities—drums, tank cars, and compartmented tank cars—from the Doe Run plant at Brandenburg, Kentucky.

POLY-SOLV EM  
ethylene glycol monomethyl ether  
POLY-SOLV DM  
diethylene glycol monomethyl ether  
POLY-SOLV EE  
ethylene glycol monoglycol ether  
POLY-SOLV DE  
diethylene glycol monoglycol ether  
POLY-SOLV EB  
ethylene glycol monobutyl ether  
POLY-SOLV DB  
diethylene glycol monobutyl ether

For complete information, data sheets, and samples, call or write today.

**MATHIESON CHEMICALS**  
OLIN MATHIESON CHEMICAL CORPORATION  
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ETHYLENE OXIDE • ETHYLENE GLYCOL • DIETHYLENE GLYCOL • TRIETHYLENE GLYCOL • POLYGLYCOLS • DICHLOROETHYLETHET  
ETHYLENE DICHLORIDE • METHANOL • SODIUM METHYLATE • ETHYLENE DIAMINE • CAUSTIC SODA • SODA ASH • CHLORINE • SULPHURIC ACID  
SULPHUR • AMMONIA • NITRATE OF SODA • DICARBONATE OF SODA • CARBON DIOXIDE • SODIUM CHLORITE • CALCIUM HYPOCHLORITE

2853

When inquiring check CP 6084 opposite last page

## Coatings that have superior properties made easily from PVA emulsion . . .

economies in material costs also accrue

**Uses:** As a vehicle for compounding primer-sealers, interior, exterior, and industrial coatings.

**Features:** Emulsion offers formulators wide latitude in attaining desired properties in finished coating. Formulations can be varied, thereby considerably reducing inventory problems. Economies in material costs can also be achieved.

Coatings made with the emulsion resist fats and oils, are stable to light and oxidation, and have high moisture vapor transmission. They adhere well to most non-metallic surfaces. Application is easy with minimum non-persistent odor. Fast-drying, top coating can be done immediately.

**Description:** An unplasticized polyvinyl acetate emulsion of anionic type, Nopco 1572-R has these physical and chemical properties:

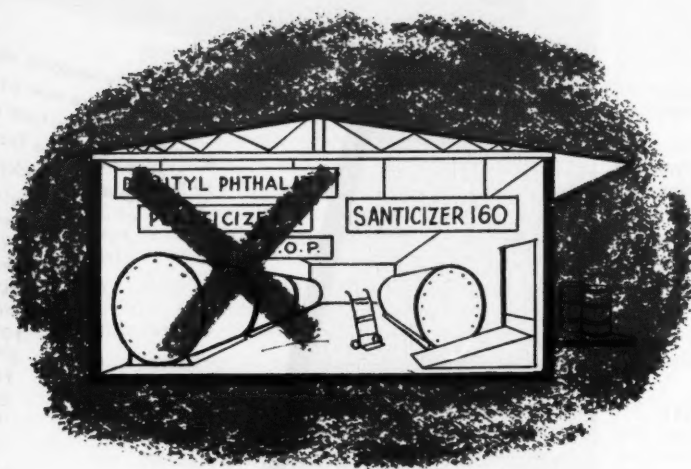
Viscosity (Brookfield:	
Spindle 3, 60 rpm, cps)	900-1200
Particle size (microns)	1-4
pH	4-5
Solids (% min)	55
Monomer vinyl acetate (%)	0.5
Density (lb/gal)	10

In compounding, a plasticizer such as dibutyl phthalate or butyl benzyl phthalate should be uniformly dispersed in the emulsion. Pigment dispersions are first prepared in water, adding a dispersing agent. Methocel and carboxymethylcellulose are satisfactory thickening agents, if aqueous dispersions are prepared prior to incorporation. Surface-active agents for special effect, and preservatives are the other ingredients required. Standard equipment is adequate for compounding these paints.

(PVA emulsion is a product of Nopco Chemical Co., Inc., Dept. CP, Harrison, N.J. . . or for more information about manufacturer's product, check CP 6085 on the convenient Reader Service slip which is located opposite last page.)

# for your information...

brief summaries of helpful product news



Santicizer 160 from Monsanto replaces several other space-consuming plasticizers.

## How Production Men Can Reduce Costs By Reducing Inventory with Santicizer 160

If you are troubled by high storage costs and high inventory stocks, Santicizer\* 160, one of Monsanto's quality plasticizers, may be just what you are looking for.

This versatile material is now being specified in numerous plants because it is the best general-purpose primary plasticizer now available for:

vinyl and nitrocellulose lacquers, polyvinyl acetate and polystyrene paints, vinyl organosols and plastisols.

You will find Santicizer 160 can do

many of the jobs that formerly required such diverse products as DOP, DBP and similar materials.

And besides saving on inventory, Santicizer 160 has numerous other advantages, too. It has a wide range of compatibility, resists abrasion and extraction by various oils, gasoline and water.

Additional advantages include good heat and light stability plus lower volatility than DBP and only slightly higher volatility than DOP.

For information, send in the coupon today.

## Defoamer PC-1244—New Defoaming Agent

Monsanto's new defoaming agent, Defoamer PC-1244, is particularly effective in systems where the continuous phase is organic in nature or in single-phase organic systems. The effective concentration varies from 5 to 5000 parts per million, depending on the system (average use concentration 250 ppm).

PC-1244 is soluble in many common solvents, shows excellent lasting qualities in systems with a pH below 7. It must be well mixed or dispersed for maximum efficiency.

### APPROXIMATE PROPERTIES OF DEFOAMER PC-1244

**Appearance of 100% materials:** Straw-colored to yellow, viscous semisolid.

**Soluble in:** Benzene, toluene, kerosene, petroleum, ether, carbon tetrachloride, isopropanol, tertiary amyl alcohol, butyl cellosolve and ethyl acetate.

**Insoluble in:** Water, methanol, ethanol and methyl cellosolve.

PC-1244 is currently supplied as a 40% solution in kerosene and is available in commercial quantities.

## Tips on Handling Phthalic Anhydride Featured in New Book

Recommendations for in-plant handling of this versatile compound in either liquid (molten) or flake form are fully discussed, together with Monsanto's special phthalic anhydride shipping methods.

This booklet also describes uses of the product in the manufacture of alkyd and polyester resins, phthalate plasticizers, and in the production of dyes, pharmaceuticals and complex organic compounds.

Write Monsanto on your company letterhead for a copy.

## Santolene J Reduces Sedimentation of Base Oils

In recent trials conducted by Monsanto, Santolene\* J, a new addition agent, used at a concentration of 25 pounds per 1000 barrels of fuel oil, stabilized color and reduced sedimentation of most base fuels.

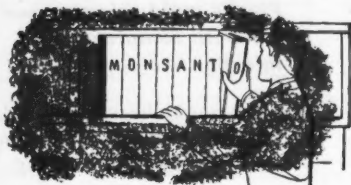
For example: after 12 weeks' storage at 110° F., oil treated with Santolene J had an NPA color of D-5,



sediment measured 27 milligrams per liter. The untreated oil's color had darkened to D-6 and sediment per liter amounted to 103 milligrams.

Santolene J is not subject to depletion by water extraction, will not form fuel oil-water emulsions which create oil haze or foaming problems, and is not affected by ordinary storage temperatures.

Write to Monsanto for a technical bulletin which describes Santolene J and contains results of stability, sedimentation and rusting tests.



### New Technical Bulletin on DDS Available

A technical bulletin has been prepared on dihydroxy diphenyl sulfone (DDS)—a chemical which promises to improve production of heat-resistant epoxy and phenolic resins.

Although primarily used as an agent in electroplating baths, DDS may also be useful as an intermediate in organic synthesis, particularly when a phenolic compound stable to the oxidizing action of light and air would be valuable.

Several important DDS reactions, keyed to an extensive bibliography, are diagrammed in the bulletin. Write to Monsanto today for your copy.

### Reinforced Plastics Fill Industry Need For Rugged Glazing

The recent growth of reinforced plastics in the consumer field has tended to obscure an equally important advance in the field of industrial applications.

Management of large industrial plants is turning more and more to reinforced plastic panels for side-lights and skylights.

Actual use in these applications shows that reinforced plastic panels have several advantages which make

them outstanding for industrial application.

These panels are extremely strong and virtually shatterproof. They are lightweight, easy to assemble, completely translucent and require a minimum of maintenance. In addition, they are highly resistant to the effects of sun and weather.

Monsanto plays an important role in furnishing the raw materials for the resins which go into these reinforced plastics. It produces maleic and phthalic anhydrides, styrene monomer.

For more information on these products and their potentials in the reinforced plastic field, send in the coupon.

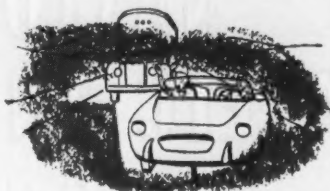


### Ortho-Nitrochlorobenzene Chart Now Available

A large wall chart outlining the synthesis of over 120 compounds based on ONCB is now available from Monsanto.

Here on one page is a concise, ready reference showing the important chemical reactions of this versatile intermediate. Mail the coupon to get your copy.

### New Multipurpose Additive Increases Lubricant Efficiency



A true multipurpose additive which sets a new standard of gear lubricant performance has just been developed by Monsanto.

Called Santopoid\* 44, the new additive combines in one product the best performance characteristics of several separate additives which are effective only in limited applications.

Lubricants compounded with Santopoid 44 provide complete passenger car hypoid protection under the most severe road test and laboratory conditions... not only in the SAE 90 grade but in the SAE 80 grade as well.

Field experience proves Santopoid 44 also gives better heavy-duty truck and bus gear protection without compromising superior high-speed performance. Heavy equipment is protected even when performing the most severe off-highway service.

For information, please mail coupon.

\*Reg. U.S. Pat. Off.



MONSANTO CHEMICAL COMPANY 4/55  
810 N. Twelfth Street, St. Louis 1, Missouri

#### Please send:

- ☐ Santicizer 160 (Tech. Bul. No. O-92)  
☐ Defoamer PC-1244 (Tech. Bul. No. O-76)  
☐ Santolene J bulletin  
☐ DDS bulletin  
☐ ONCB wall chart

- ☐ Santopoid 44 Tech. Bul.

#### Information on:

- ☐ Maleic Anhydride  
☐ Phthalic Anhydride  
☐ Styrene Monomer

Name.....Title.....

Company.....

Street.....

City.....Zone.....State.....

### Reagent-grade chemicals available in bulk quantities . . .

100 to 600-lb drums carry individual lot analyses

Company's "Certified Reagents" are now available to manufacturers and pilot-plant engineers in 100 to 600-lb drum lots. Chemicals are reagent-grade and each drum carries individual lot analysis. Manufacturer states that bulk quantity shipments will permit an economic saving to the user.

(Bulk reagent-grade chemicals are available from Fisher Scientific Co., Dept. CP, 711 Forbes St., Pittsburgh 19, Pa. . . or for more information check CP 6086 on handy Reader Service slip which is located opposite last page.)

### Biological actions of the Versenes

Of particular interest in pharmaceutical and food fields is this digest-size brochure on the biological actions of the Versenes chelating agents.

Studies described in the 84-page booklet establish that these powerful chelating agents may be used in small quantities in foods and beverages for control of deleterious action of trace metals. Compound has been incorporated in a number of pharmaceutical preparations which have been cleared as safe for use under specified conditions.

"The Biological Action of the Versenes" is issued by Versenes Inc., Dept. CP, 875 Waverly St., Framingham, Mass. When inquiring reader may specify CP 6087 on handy form opposite last page.

For more information on product at left, specify CP 6088 . . . see information request blank opposite last page.

Screen analysis shows

# NATIONAL MALEIC ANHYDRIDE TABLETS

have up to 75-90% fewer fines  
"as delivered"



NATIONAL TABLETS BRAND A BRAND B  
2 mesh "fines" screened from drums after 1,000 mile truck haul

Common sense says that lower surface area to weight and a smooth "cornerless contour" *should* mean less degradation in transit and in handling. Careful screen analysis after a 1,000 mile truck haul proves beyond question that National Maleic Anhydride Tablets *do* have up to 75-90% fewer fines "as delivered".

But —

"Less fines" is only one good reason to specify National Maleic Anhydride Tablets. Quick dissolving, uniformity and high quality are equally important to your Process Control.

So for prompt delivery of premium-quality material from nearby Moundsville, W. Va. specify National Maleic Anhydride Tablets on your next order. Samples, technical data and prices cheerfully on request!

**NATIONAL ANILINE DIVISION**  
**ALLIED CHEMICAL & DYE CORPORATION**  
40 NECTON STREET, NEW YORK 6, N. Y.

Boston Providence Philadelphia Chicago San Francisco  
Portland, Ore. Greensboro Charlotte Richmond Atlanta  
Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto



## Materials

### Charts composition of oils and fats

Acid compositions of oils and fats, from babassu to whale, are presented in 11 x 16" chart.

"Oils and Fats Chart" prepared by Technical Products Div., E. F. Drew & Co., Inc., Dept. CP, 15 E. 26th St., New York 10, N.Y. When inquiring specify CP 6090 opposite last page.

### Plastic mold release used for both compression, injection molding

**Uses:** Mold release for plastics can be used for both compression and injection molding.

**Features:** Compound dries almost instantly to a hard, glossy, smooth finish that destroys affinity of plastic for the mold. Molded parts can be readily cemented together, electroplated, or painted.

**Description:** Super XX mold release is crystal-clear, will not stain even lightest stocks.

(Mold release is a product of Vin-Rock, Inc., Dept. CP, 8211 Almira Ave., Cleveland 2, Ohio. Check CP 6091 opposite last page.)

### Properties, applications of red oxide pigments

Properties and applications of synthetic red iron oxide pigments are presented in four-page bulletin. Charts show why these precipitated colors have extreme brightness, and clarity of mass color, clean tint, and high tinting strength.

"Kroma Reds" is issued by C. K. Williams & Co., Dept. CP, Easton, Pa. Specify CP 6092 on form opposite last page.



For more information on product at left, specify CP 6089 . . . see information request blank opposite last page.

new ch

(Conti

85) C  
CICH<sub>3</sub>  
of sub  
alcohol

86) C  
CICH<sub>3</sub>  
Reacts  
Works

87) 2  
Melts:  
nitro g

88) A  
Corbo  
CH<sub>3</sub>CO

89) A  
atom  
temp  
hibits  
toxic i

90) 5  
interm

91) A  
pharm  
51.5°

92) C  
Co soa  
Chem.

93) I  
(CH<sub>3</sub>)  
quant  
be im  
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94) C  
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rayon  
bleach  
nylon

APRIL



new chemicals — 85 to 99

(Continued from page 33)

85) **CHLOROMETHANEPHOSPHONIC ACID** —  $\text{ClCH}_2\text{PO}_3\text{H}_2$ . Tech. Polymerization catalyst. For synthesis of substituted organic phosphonic acids, salts. Sol: water, alcohol. Sl. sol: hydrocarbon. Exp. Victor Chem. Works.

86) **CHLOROMETHANEPHOSPHONYL CHLORIDE**  $\text{ClCH}_2\text{POCl}_2$ . Tech. Makes phosphonic acids, esters, salts. Reacts vigorously with water, alcohols. Victor Chem. Works.

87) **2-CHLORO-4-NITROPHENOL** — Intermediate. Melts:  $106^\circ$ . Undergoes reactions typical of phenolic and nitro groups. Exp. Monsanto.

88)  **$\beta$ -CHLOROPROPIONIC ACID** — Intermediate. Carboxyl group activates Cl atom. Exp. 99+%  $\text{ClCH}_2\text{CH}_2\text{CO}_2\text{H}$ . Dec. at  $204^\circ$ . Causes burns. Monsanto.

89)  **$\beta$ -CHLOROPROPIONITRILE** —  $\text{ClCH}_2\text{CH}_2\text{CN}$ . Cl atom activated by nitrile group, is easily replaced. High temp or bases demurrate it to acrylonitrile. Otherwise, exhibits typical nitrile reactions. 98+% pure. Exp. Highly toxic if ingested. Dec. at  $176^\circ$ . Monsanto.

90) **5-CHLOROSALICYLIC ACID** —  $\text{C}_6\text{H}_4\text{ClO}_2$ . An intermediate of unknown application. Dow Chem.

91) ***p*-CHLOROTHIOPHENOL** — For insecticides, pharmaceuticals.  $\text{ClC}_6\text{H}_4\text{SH}$  has 99% purity, melts at  $51.5^\circ$ . Sol: organics. Insol: water. Exp. Evans Chemetics.

92) **COBALT HYDRATE** — 98% pure. For making Co soaps and driers. Excellent reactivity, stability. Witco Chem.

93) **N-COCO  $\beta$ -AMINO BUTYRIC ACID** — R-NH- $(\text{CH}_2)_5\text{COOH}$ . Tech. 55-50% aq. gel in pilot plant quantities. Amphoteric, a wide range of properties can be imparted. Na salt is suds and foam stabilizer for synthetic detergents. Armour.

94) **COCONUT FATTY ACID** — Double distilled. Eldo 155 has 21-27° titre, light color. Uses: make soap, cosmetics, textile chemicals, alcohols. CP Grade. El Dorado.

95) **COLOR DISPERSIONS** — For pigmentation of molding and extruding nylon, and color dispersions internally dispersed in Zytel 63 (Du Pont). No other ingredients added. Sol: solvents suitable for nylon. Available in seven colors, including black and white. Acheson Dispersed Pigments.

96) **COMONOMERS** — Octyl maleates and fumarates are used in copolymerization reactions, in making inherently flexible polymers. Impart non-extractable, non-volatile characteristics. High purity. Rubber Corp. of Am.

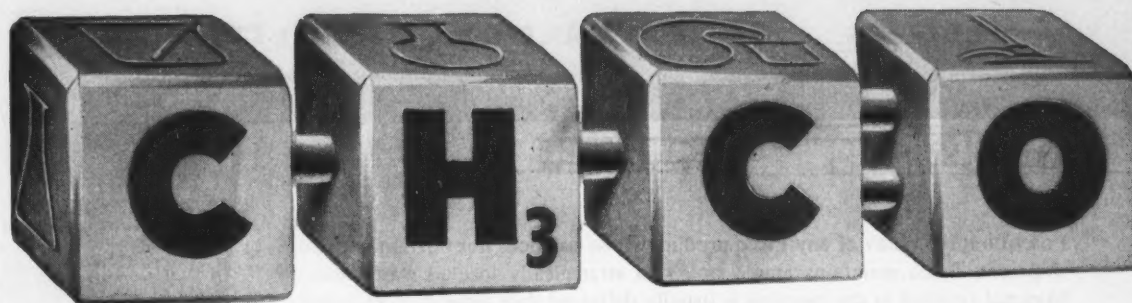
97) **COPOLYMER OF BUTADIENE WITH ACRYLONITRILE** — Polycy 563 as a coating and saturant for leather, paper, and textiles, where tough, oil- and water-resistant film is required. A stable aq. dispersion of butadiene copolymerized with acrylonitrile, material is free of monomeric plasticizer, yields an inherently flexible film. Borden Co.

98) **COPPER STANNATE** — Pure  $\text{CuSnO}_3 \cdot 3\text{H}_2\text{O}$  is supplied for special ceramic uses. A less pure — but more soluble — product is used for electroplating of copper-tin alloys. Sol: alkali cyanide solns; insol: water. Metal & Thermit Corp.

99) **COUMARIN DERIVATIVE** — Blancophor FFG is an optical whitening agent for wool, nylon, acetate rayon, mixed fibers. Gives blue-white brilliancy on bleached white yarns, piece goods. Cuts yellowing of nylon during heat setting. General Aniline — Antara.

(Continued on next page)

simple as



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When inquiring check CP 6093 opposite last page

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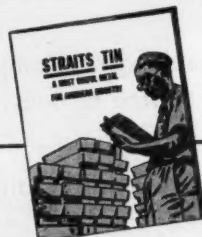
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When inquiring check CP 6094 opposite last page



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## THE ALPHA CORPORATION

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When inquiring check CP 6096 opposite last page

## Materials—Feature Section

### new chemicals — 100 to 127

(Continued from preceding page)

100) CRESYL PHENOL PHOSPHATE — Kronitix MX produces non-burning films, imparts low temp flex when used as plasticizer with vinyl and other resins. Viscosity is lower than other tricresyl phosphates. BP: 342°C. Ohio-Apex of FMC.

101) CROTYL BROMIDE —  $C_4H_7Br$  is highly reactive allylic bromide. Purity: 95%. Sol: most organics. 95% boils at 98-102°. Experimental. Aldrich Chem.

102) CUPRIC FORMATE —  $Cu(CHO_2)_2 \cdot 4H_2O$ , tech and CP. Sol: Water. Sl. sol: alcohol. Exp. City Chemical Corporation.

103) CUPRI-MAGNESIUM DEHYDROABIETYL AMINE 8-HYDROXYQUINOLINIUM 2-ETHYLHEX-OATE — Cunimine #2243 is used as a fungicide for cellulosic materials, specifically for fabrics. Scientific Oil Compounding.

104) CYCLETHRIN — 3-(2-Cyclopentenyl)-2-methyl-4-oxo-2-cyclopentenyl chrysanthemum monocarboxylate. Is suggested for oil sprays, aerosols for household, industrial use; in oil and water sprays to control parasites on livestock; in insect-resistant packagings, in grain-protectant dusts; on agricultural crops. Readily synergized. Has very low order of mammalian toxicity. Exp. Union Carbide and Carbon Corp.

105) CYCLOHEPTANONE —  $CH_2(CH_2)_5CO$ . Solvent, intermediate. Purity: 98-100%. BP: 179-181°. Exp. East-ern Chem.

106) CYCLOHEXANE OXIDE —  $C_6H_{10}O$ . 99+% pure. BP: 129-130°. For syntheses of glycol ethers, amine alcohols, other organics. Exp. Arapahoe Chem.

107) CYCLOHEXENE — Intermediate for pharmaceuticals, general organics.  $C_6H_{10}$ . MP: 103.7°. BP: 83°. Sl. sol: water. Sol: alcohol, ether. Exp. Kay-Fries.

108) CYCLOHEXYL CHLORIDE —  $C_6H_{11}Cl$ . Suggested uses: pharmaceutical and general organic intermediate. MP: -43.9°. BP: 142°. Insol: water. Sol: benzene, ether. Exp. Kay-Fries.

109) CYCLOPENTYL CHLORIDE —  $C_5H_9Cl$  of 99+% purity. To introduce cyclopentyl group into drugs. In Grignard reaction, gives greater yields than the bromide. Semi-commercial. Arapahoe Chem.

110) DECYL ACRYLATE — A comonomer for making resins for surface coatings, pour point depressants, VI improvers for lube oils, and textile finishes. Sl. sol: water. Sol: most organics.  $CH_3CHCOOC_{10}H_{21}$  boils at 121° @ 10 mm. Union Carbide.

111) DECYL BUTYL PHTHALATE — PX-114 is primary plasticizer for vinyl formulations. Highly compatible, economical. Good heat, light stability. Pittsburgh Coke and Chemical.

112) DEFOAMER — Effective in continuous or single-phase organic systems. Defoamer PC-1244, a liquid, is sol in most organics. Insol: water, methanol, ethanol. Supplied as 40% soln in kerosene. Monsanto.

113) DEHYDRO ABIETYL AMMONIUM PHENOXIDE — Cumimene D-2747 (a synergistic formulation of this compound) finds application as preservative for emulsion paints. Scientific Oil Comp.

114) DESUGARED CALCIUM LIGNOSULFONATE — For leather, dispersants, emulsion stabilizers, adhesives, water treating, to name a few. Intermediate for vanillin. Hypothetical formula:  $C_{20}O_{2.2}H_{2.2}Ca_{0.2}S_{0.2}$ . Low cost, versatile, non-toxic. Sol: water. Lake States Yeast.

115) D scouring goods, emulsify Products

116) D SALTS general soybean cationic est in so zation.

117) D [OCN( 221° @ mers, re

118) 1 Chemical

119) D ing agen Econom oreticall

120) M in, plast cid al ac  $C_6H_{12}O_2$

121) D curing a syntheses Carbide.

122) D ATE—E vinyl, resins. C Insol: w Exp. Vi

123) D agent. T BP: 108 santo C

124) D Cl, Pur poses w group. I

125) 3 NH<sub>3</sub>. In

126) 2 HClO. theses. I Exp. Ka

127) D  $C_6Cl_2O_2$  gredient Gives fa

unle

1) C

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3) B

4) T

5) S



## Materials—Feature Section

115) **DETERGENT FOR NYLON** — Chem ND for scouring, cleaning nylons, as well as woolens, piece goods, silks, rayons, cottons. High detergent action with emulsifying properties for oils, greases, waxes. Chem. Products.

116) **DIALKYL QUARTERNARY AMMONIUM SALTS** — Mixed salts, called Arquads 2S and 2T have general formula:  $R_2N(CH_2)_3^+ Cl^-$ . 2S derived from soybean oil; 2T, from tallow. Industrial grades. Uses: cationic wetting, foaming, emulsifying agents. Of interest in secondary oil recovery. Has effects on dye-solubilization. Armour.

117) **DIANISIDINE DIISOCYANATE** — DADI.  $[OCN(CH_2O)C_6H_4]_2$ . 97% min pure. MP: 122°. BP: 221° @ 1.8 mm. Makes rigid and flexible foams, elastomers, resins, fibers, adhesives. Exp. Carwin Co.

118) **1,1'DIANTHRIMIDE** — B reagent. Eastern Chemical.

119) **DIASTATIC ENZYME** — Rhozyme MH, a desizing agent for textiles. Has high heat stability and activity. Economical. Measured on substrates of starch, it is theoretically entirely active. Sol: water. Rohm & Haas.

120) **trans-1,2-DIBENZOYL ETHYLENE** — Uses: resin, plastics compounding; antienzyme, bactericidal, fungicidal action; intermediate for chemicals, pharmaceuticals.  $C_{18}H_{12}O_2$  melts at 109-110°. Exp. National Aniline.

121) **DIBUTYL AMINO PROPYL AMINE** — Uses: curing agent for epoxy resins, intermediate for chemical syntheses. Sol: water, organics. BP: 235-238°. Union Carbide.

122) **DIBUTYL CHLOROMETHANEPHOSPHONATE** —  $ClCH_2PO(OC_4H_9)_2$ , tech. Low-temp. plasticizer for vinyl, cellulose acetate, nitrocellulose, ethyl cellulose resins. Gives flame resistance to vinyls, cellulose acetate. Insol: water. Sol: common organics. BP: 101° @ 1.5 mm. Exp. Victor Chem. Works.

123) **DIBUTYL FUMARATE** — Vinyl copolymerizing agent. Tech grade has purity of 99+%  $(C_4H_5OOCCH)_2$ . BP: 108-110° @ 0.5 mm. Sol: common organics. Monsanto Chemical.

124) **DICHLOROACETYL CHLORIDE** —  $Cl_2CHCOCl$ . Purity 98.5% min. Boils: 108°. Sol: ether. Decomposes water, alcohol. Ready availability of dichloroacetyl group. Exp. Kay-Fries.

125) **3,4-DICHLOROANILINE** — 97% min,  $Cl_2C_6H_3NH_2$ . Intermediate. Melts: 70-71°. Exp. Monsanto.

126) **2,3-DICHLORODIOXANE** —  $CH_2CH_2OCHCl_2$ . HClO. Uses: Pharmaceutical and general organic syntheses. BP: 69-71° @ 9 mm. Has reactive chlorine atom. Exp. Kay-Fries.

127) **DICHLOROMALEIC ANHYDRIDE** — 95%  $C_4Cl_2O_3$ . Uses: epoxy resin curing agent, alkyd resin ingredient. MP: 116-119. Moderate toxicity. Sol: ketones. Gives fast cure, low exotherm. Exp. Westvac.

(Continued on page 41)

### unless otherwise specified . . .

- 1) Commercial quantities are available ("Exp." indicates otherwise)
- 2) Pressures are in mm of mercury (abs.)
- 3) Boiling points are at 760 mm
- 4) Temp is in °C
- 5) Solubilities are at "room temp"



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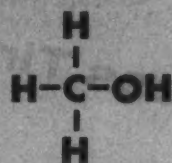
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SPECIFICATIONS OF



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Du Pont Methanol is guaranteed pure (99.85%) synthetic methanol featuring these important specifications (partial listing):

- Distillation Range.....1.0°C. Maximum
- Non-volatile Content.....0.001% Maximum
- Acetone Content.....0.003% Maximum
- Acidity or Alkalinity.....0.003% Maximum
- Color, A.P.H.A.....5 Maximum
- Odor.....free from foreign odor
- Permanganate Test.....30 Mins. Minimum

\*ASTM Method D-258

(All Percentages on Weight Basis)

### PRINCIPAL USES

Methanol and products derived from methanol find application in a variety of industries (partial listing):

- **AVIATION**—carburetor injection fluid for increasing power and fuel-octane rating
- **AUTOMOTIVE**—anti-freeze for radiators and air brakes; ingredient of gasoline and diesel-oil anti-freeze
- **CHEMICAL**—raw material for methyl esters of organic and inorganic acids and formaldehyde
- **FOOD**—extractant for animal and vegetable oils
- **FINISHES**—solvent for finishes and wood-dye stains
- **METALS**—raw material for manufacture of methyl borate for soldering flux; cleaning of metal parts during fabrication
- **PEST CONTROL**—intermediate for certain fumigants and insect repellents
- **PHARMACEUTICAL**—solvent in manufacture of cholesterol, streptomycin, vitamins, hormones and other pharmaceuticals
- **PLASTICS**—intermediate for certain plastics, plasticizers; solvent and solvent adjuvant for certain polymers; softening agent for pyroxylin plastics
- **REFRIGERATION**—raw material for methyl chloride and sodium methylate; ingredient in anti-freeze brines for non-food uses and in anti-freeze for refrigerant lines

If you wish to investigate any of these uses of Du Pont Methanol that seem promising for your needs, we will be glad to send specific data. Simply mail this coupon below, or write on your letterhead today.



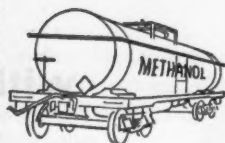
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San Francisco... Braun-Knecht-Heimann Co.  
1400 Sixteenth Street

#### COLORADO

Denver... The Chemical Sales Co., 1125 Seventh St.

#### FLORIDA

Jacksonville... Apperson Chemical, Inc.  
2903 Strickland Street  
Miami... Biscayne Chemical Laboratories, Inc.  
200 N. E. 11th Street

#### ILLINOIS

Chicago... Central Solvents & Chemicals Co.  
2540 W. Flournoy Street  
Chicago, Phillips & Martin Co., 5524 N. Wolcott Ave.

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Indianapolis... Hoosier Solvents & Chemicals Corp.  
1650 Luett Avenue

#### KANSAS

Wichita... Barada & Page, Inc., 2041 N. Mosley Ave.

#### KENTUCKY

Louisville... Dixie Solvents & Chemicals Co.  
Dixie Highway & Appleton Lane

#### LOUISIANA

New Orleans... Southern Solvents & Chemicals  
Corp., 917 Jefferson Highway, P. O. Box 4067

#### MARYLAND

Baltimore... Leidy Chemicals Corp., 920 S. Eutaw St.

#### MASSACHUSETTS

Boston... Howe & French, Inc., 101 Broad Street

#### MICHIGAN

Detroit... Western Solvents & Chemicals Co.  
6472 Selkirk Avenue  
Grand Rapids... Wolverine Solvents & Chemicals  
Co., 1500 Century Ave., S. W.

#### MINNESOTA

St. Paul... Lyon Chemicals, Inc., 2305 Hampden Ave.

#### MISSOURI

Kansas City... Barada & Page, Inc.  
Guinotte & Michigan Avenues  
Kansas City... John T. Kennedy Sales Co.  
26th Street & Southwest Blvd.  
St. Louis... Missouri Solvents & Chemicals Co.  
419 De Soto Avenue

#### NEW JERSEY

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Page & Newark Avenues

#### NEW YORK

Binghamton... Collier Chemical Co., Broad Street  
Buffalo... Chemical Sales Corp., 1382 Niagara Street  
Rensselaer... Eastern Chemicals, Inc., South Street  
Rochester... Chemical Sales Corp., 1600 Jay Street  
Syracuse... Eastern Chemicals, Inc., 103 N. Beech St.

#### NORTH CAROLINA

Durham... Cardinal Products, Inc. P. O. Box 1611

#### OHIO

Cincinnati... Amco Solvents & Chemicals Co.  
4619 Reading Road  
Cleveland... Ohio Solvents & Chemicals Co.  
3470 W. 140th Street  
Toledo... Western Solvents & Chemicals Co.  
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3950 N. W. Yeon Avenue

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Pittsburgh... Vitro Manufacturing Co.  
60 Greenway Drive

#### TEXAS

Dallas... Van Waters & Rogers, Inc.  
10216 Denton Road  
Houston... Texas Solvents & Chemicals Co.  
8501 Market Street

#### UTAH

Salt Lake City... Braun-Knecht-Heimann Co.  
650 West Eight South Street  
Salt Lake City... Wasatch Chemical Co.  
2225 South Fifth East Street

#### WASHINGTON

Seattle... Van Waters & Rogers, Inc.  
4000 First Avenue, South  
Spokane... Van Waters & Rogers, Inc.  
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#### WISCONSIN

Milwaukee... Wisconsin Solvents & Chemicals Corp.  
1719 S. 83rd Street

When inquiring check CP 6098 opposite last page



new chemicals — 128 to 143

(Continued from page 39)

128) **DICYCLAMINE E8** — Oil-soluble amine,  $C_{11}H_{21}NH$ , for making oil demulsifiers, corrosion inhibitors, surface-active agents, rubber chemicals. DL-(2,5-endo-methylene cyclohexyl methyl) amine. BP: 169° @ 10 mm. Freezes: 50°. Exp. Union Carbide.

129) **DICYCLOHEXYL CARBINOL** — >98%  $C_{12}H_{23}O$ . BP: 135° @ 5 mm. MP: 58°. For pharmaceuticals. Trubek Labs.

130) **DICYCLOHEXYL KETONE** — 98% (min)  $C_{12}H_{22}O$ . BP: 120° @ 3 mm. MP: 11°. Water-white liquid makes pharmaceuticals, other organics. Trubek Labs.

131) **O,O'-DIETHYL CHLOROTHIOPHOSPHATE** —  $(C_2H_5O)_2POCl$ . 97.0%. BP: 80° @ 16 mm. Sol: alcohol, acetone. Use: for agricultural chemicals. Monsanto.

132) **DI(2-ETHYL HEXYL) CHLOROMETHANE-PHOSPHONATE** — Low-temp plasticizer for vinyl, nitricellulose, ethyl cellulose plastics. Imparts flame resistance to vinyls.  $ClCH_2PO(OC_2H_5)_2$ , tech. Insol: water. Sol: common organics. MP: <70°. BP: 155° @ 1 mm. Exp. Victor Chem. Works.

133) **DIETHYL SULFIDE** — 98%. BP: 89-93°. Exp. Index Chem.

134) **DIETHYLAMINO PROPLYMINE** — Curing agent for epoxy resins, intermediate for organics. Boils: 169.4°. Freezes: <-100°.  $(C_2H_5)_2NC_3H_7NH_2$ . Sol: water, most organics. Union Carbide.

135) **DIETHYLENE GLYCOL DIBENZOATE** — Used as plasticizer, Benzoflex 2-45 has high solvation for vinyl resins. Min purity is 98%. MP: 28°. BP @ 1 mm: 200-205°. Insol: water. Sl. Sol: aliphatics. Sol: aromatics. Tennessee Products.

136) **DIETHYLENE GLYCOL ETHYL ETHER** — Dowanol 17 has formula  $C_6H_{14}O_3$ . Intermediate for solvent, plasticizer, brake fluid. BP: 197-203°. Dow Chem.

137) **DIETHYLENE GLYCOL METHYL ETHER** — Dowanol 16.  $C_5H_{12}O_3$ . BP: 189-195°. Brake fluid solvent. Dow Chem.

138) **DI HEXYLSODIUM SULFOSUCCINATE** — Aerosol MA is an 80% solution. Powerful penetrant, excellent Ca tolerance. Used in emulsion polymerization, as wetting agent in dilute solns of salts. American Cyanamid Company.

139) **DIHYDROXYDICHLORODIPHENYLMETHANE** — Cuniphen #2778-I is a preservative for adhesives used in food industry. Scientific Oil Comp.

140) **DIHYDROXYFUMARIC ACID** — 95%  $C_4O_6H_4$ , used in production of pharmaceuticals, resins, and as a reagent for detecting Ti and thorides. Sol: water, ethanol. MP: d. 140°. Exp. Jasonols.

141) **3,5-DIIODOSALICYLIC ACID** — Direct use: As a source of iodine for trace mineral salt and feed for cattle nutrition.  $C_7H_5O_6I_2$ , is stable to air oxidation, iodine loss. Non-toxic, physiologically available. Purity: 97% min. Insol: water, brine. Ringwood Chem.

142) **DI-ISO-DECYL ADIPATE** — Adipol XX,  $(C_{10}H_{19}COOC_2H_4)_2$ , plasticizer with vinyls, most other resins. Low air and water loss, good low temp flex, very good on migration. A liquid, BP is 242°C. Ohio-Apex of Food Machinery & Chem.

143) **DI ISO DECYL ADIPATE** — Shows promise as low-cost replacement for di octyl sebacate. Low-temp, electrical characteristics are very close. Dewey & Almy.

(Continued on next page)

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BY 2,500,000 FILTER CHANNELS PER SQ. IN.!

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clarity in food products, for removing impurities from chemicals, petroleum, and other products... Celite offers unequalled advantages.

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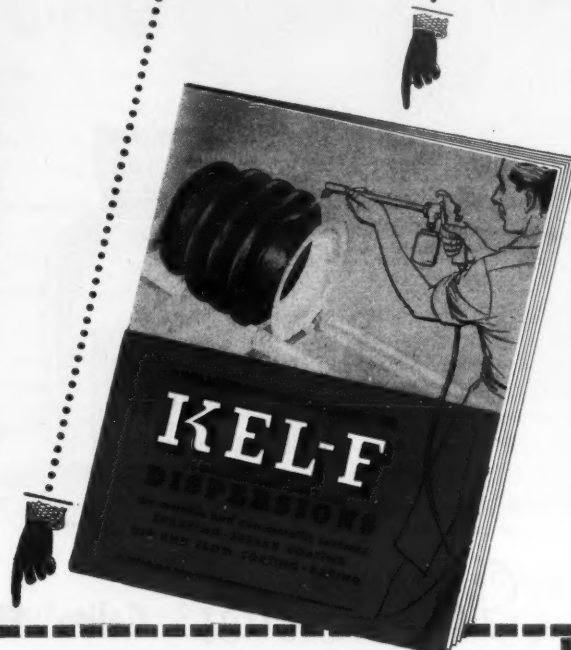
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In this 20-page **KEL-F®**  
Dispersions Manual

Learn how you can get the advantages of KEL-F fluorocarbon plastic: corrosion and heat resistance, anti-adhesion, abrasive resistance, excellent electrical properties, moisture resistance *in a dispersion coating, for application by spraying, dipping or spreading*



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Chemical Manufacturing Division  
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Please send me my copy of the new Kellogg Manual, "Application Techniques for KEL-F® Fluorocarbon Polymer Dispersions."

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Title \_\_\_\_\_  
Company \_\_\_\_\_  
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## I am interested in Dispersion Coating Applications for:

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| <input type="checkbox"/> trailer tanks       | <input type="checkbox"/> calendaring rolls         |
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|  | <input type="checkbox"/> miniaturized relays       |

Other applications (please list) \_\_\_\_\_

When inquiring check CP 6100 opposite last page

## Materials-Feature Section

### new chemicals — 144 to 171

(Continued from preceding page)

144) DI-ISO-DECYL OCTYL ADIPATE — Adipol 810, liquid at room temp, boils at 227°C. Plasticizer with vinyls, most other resins. High BP, low air loss, good low temp flex and UV-resistance. Formula:  $C_{30}H_{52}OOC-C_6H_4-COOC_6H_{13}$ . Ohio-Apex of FMC.

145) DI ISO DECYL PHTHALATE — Elastex 90-P, primary plasticizer for vinyls.  $C_{28}H_{48}O_4$  has low volatility, 99.5% purity. Pour point:  $-30^\circ$ . Used in vinyl film, wire, cable, plastisols. Barrett Div.

146) DI ISO DECYL PHTHALATE — For vinyl plastics to improve low-temp, low-volatility. Dewey & Almy.

147) DI ISO OCTYL ADIPATE — Low-temp plasticizer in vinyl plastics where durability at low temp is required. Dewey & Almy.

148) 2,6-DIISOPROPYL PHENOL —  $C_6H_2(C_3H_7)_2OH$  is insol in water, sol in organics. MP:  $17.9^\circ$ . BP:  $242.4^\circ$ . Offers combination of phenolic hydroxyl group with two blocked ortho positions; finds use in making synthetic resins, plasticizers, surface-active agents. Ethyl Corporation.

149) p,p-DIMETHOXYBENZOPHENONE — Min 98%  $C_{15}H_{12}O_2$ . BP:  $145^\circ$ . For pharmaceuticals, other organics. Colorless crystals. Trubek Labs.

150) DIMETHYL ACETAL —  $(CH_3O)_2CHCH_2COCH_3$  is of 98% (min) purity, boiling at  $76-79^\circ$  @ 25 mm. Pharmaceutical and dye intermediate. Sol: alcohol, ether, water. Has semi-active methylene group, carbonyl group, and an acetal. Exp. Kay-Fries.

151) DI-(METHYL CYCLOHEXYLMETHYL) AMINE — Dicyclamine 8, mixed isomers of  $C_{16}H_{26}NH$ , for oil demulsifiers, corrosion inhibitors, surface-active agents, rubber chemicals. Boils:  $212^\circ$  @ 50 mm. Freezes:  $<-70^\circ$ . Sl. sol: water. Oil-soluble amine potentially available in large volumes at moderate price. Exp. Union Carbide.

152) 3,5-DIMETHYL-1-HEXYN-3-OL —  $(CH_3)_2C_6H_3(OH)CCH$ . Purity: 95%. BP:  $150^\circ$ . MP:  $-68^\circ$ . Sol: most organics. Uses: stabilization of chlorinated organics, foam suppression, surface-active agent. Air Reduction Chemical.

153) DIMETHYL MALONATE — Used as pharmaceutical intermediate, especially making barbiturates. Melts:  $-62^\circ$ ; boils:  $180-181^\circ$ . Formula:  $CH_2(COOCH_3)_2$ . 99% min purity. Insol: water. Sol: alcohol, ether. Active methylene group. Kay-Fries.

154) 2,9-DIMETHYL-1,10-PHENANTHROLINE — Reagent for Cu. Eastern Chem.

155) DIMETHYL SILICONE POLYMER — 400 Gum. For compounding silicone rubber. Sol: aromatics. Dow Corning Corp.

156) DIMETHYL SULFIDE — 98% (wt). BP:  $34-38^\circ$ . Odorant for LPG. Index Chem.

157) DIMETHYL TERTIARY AMINES — R-N(CH<sub>3</sub>)<sub>3</sub>. For Armeen DMS, "R" represents soya; for Armeen DM18, stearyl. Tech. Pilot plant scale. Uses: surface-active agents for agricultural chemicals, textiles, paper, germicidal, pharmaceutical, flotation, sanitation. Intermediates for amine salts, quaternary ammonium salts, amine oxides. Armour.

158) p-DIMETHYLAMINO BENZYLIDEN ERHODANINE — Reagent for Ag, Cu, Hg. Eastern Chem.

159)  $\gamma$ -DIMETHYLAMINOPROPYL CHLORIDE HYDROCHLORIDE — For introducing dimethylaminopropyl radical, especially in pharmaceutical manufacture.

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Formula:  $(\text{CH}_3)_2\text{N}(\text{CH}_2)_3\text{Cl}\cdot\text{HCl}$ . MP: 142-144°C. Soluble: water alcohol, polar solvents. Moderately toxic. Michigan Chem. Corp.

160) DIMETHYLAMINO PROPYLAMINE — Curing agent for epoxy resins; intermediate for wetting agents, emulsifiers, other chemicals. BP: 136.5°. Freezes below -100°.  $(\text{CH}_3)_2\text{NC}_3\text{H}_7\text{NH}_2$ . Sol: water, most organics. Union Carbide.

161) DIMETHYLGLYOXIME —  $(\text{CH}_3\text{CNOH})_2$  95-98%. MP: 235-238°. Precip. Ni, Pd, Bi. Very sensitive. Eastern Chem.

162) 3,6-DIMETHYLOCTANE-3,6-DIOL — Non-foaming surface-active agent for polymerization systems and highly alkaline systems; high-temp solvent. Purity: 95%. Boils: 241-242°. Melts: 44°. Sol: most organics. Air Reduction Chem.

163) DI OCTYL PHTHALATE — For wire, cable insulation manufacturers requiring high, uniform volume resistivity. Dewey & Almy.

164) DI OCTYL SEBACATE — Practically water-white, premium low-temp plasticizer. Can be supplied with color <100 APHA. Dewey & Almy.

165) DIPHENYLACETONE (UNSYM.) —  $\text{C}_{15}\text{H}_{14}\text{O}$ . 98% min. MP: 59.5-60.5°. Makes pharmaceuticals, other organics. Colorless crystals. Trubek Labs.

166) DIPROPYL CHLOROMETHANEPHOSPHONATE — Low-temp plasticizer for vinyl, cellulose acetate, nitrocellulose, ethyl cellulose plastics  $\text{ClCH}_2\text{PO}(\text{OC}_3\text{H}_7)_2$  tech. Insol: water. Sol: common organics. MP: -38°. BP: 82° @ 1 mm. Imparts flame resistance to vinyls, cellulose acetate. Exp. Victor Chem. Works.

167) DIPROPYLENE GLYCOL DIBENZOATE — Benzoflex 9-88 has a min assay of 98%, melts at -35°C, boils at 195-200°C @ 1 mm. Used as plasticizer, it has high solvation for vinyl resins. Insol: water. Sol: aliphatics, aromatics. Tennessee Products.

168) DIPROPYLENE GLYCOL DIBENZOATE — Flexol Plasticizer 77-G.  $\text{C}_6\text{H}_5\text{COOC}_3\text{H}_6\text{OC}_6\text{H}_5\text{OCOC}_3\text{H}_5$ . Toxicity: low. BP: 234 @ 5 mm. Freezes: -45°. Insol: water. Sol: alcohols, esters, ketones, glycol ethers. Uses: plasticizer for vinyl flooring, hydrocarbon-resistant vinyls, polyvinyl acetate coatings. High solvent power for resins; resists extraction by gasoline, mineral oil. Union Carbide.

169) DISODIUM ADENOSINE TRIPHOSPHATE — High purity, for investigations of biochemical reactions. Free from non-adenine nucleotides. Crystalline. Exp. Pabst Labs.

170) DODECENYL SUCCINIC ANHYDRIDE — Mixture has >80%  $\text{C}_{18}\text{H}_{34}\text{O}_3$  + substances of longer side chains. BP: 180-182° @ 5 mm. Uses: corrosion preventive; mineral oil pour point improver; making alkyd resins, synthetic lubricants, plasticizers, extenders for paints, rubbers, resins, varnishes. National Aniline.

171) DODECYL BENZYL TRIMETHYL AMMONIUM CHLORIDE — DBT 50 is used as an algicide in water towers, storage and cooling ponds, cooling water systems. It is efficient in low concentrations. 50% soln. Fine Organics.

(Continued on next page)

Use-index for all these products starts on page 80.

Manufacturer address list starts on page 82. Use it when writing for more information.

## Dowicide Preservative

cuts building costs  
by opening dramatic  
new uses for  
insulation board

Popular cellulosic materials are  
protected against rot, mildew and  
termites by the addition of  
Dowicide 7 (Pentachlorophenol)

Building board, treated with Dowicide Preservative by manufacturer to help prevent deterioration from mold, mildew and termites, here cuts costs greatly by doubling as sheathing and exterior finish.



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the uses of Dowicide Preservatives.

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you can depend on **DOW CHEMICALS**

**DOW**

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Examination of the samples above tells you what's happened to insulation board. They are identical in all but one vital respect: piece at top was treated by manufacturer with Dowicide® 7, one of Dow's fourteen effective industrial preservatives. Exposure to severe use conditions shows treated sample completely free of rot and mildew that are well on the way to deteriorating the untreated board.

In addition to lowering maintenance expense, Dowicide-treated insulation board cuts material and labor costs through its easy, fast installation as sheathing, lath, shingle backer, siding, roof insulation, interior panels and other applications.

Among the businesses that increase manufacturing efficiency or hold top product quality with the help of Dowicide Preservatives are the petroleum, paint, paper and pulp, adhesives, textile, agricultural, transportation, leather, cordage and other industries. Your processing, packaging or selling might benefit markedly through use of one or several of these versatile Dowicide products. The Dow laboratories will consult with you regarding individual preservative problems. For more information, mail coupon to THE DOW CHEMICAL COMPANY, Midland, Michigan.



The laboratory methylating equipment shown above is being explained by Dr. T. R. Patterson, head of our Methylation Department.

## Your methylating problems could end here!

If you have a problem relating to the methylation of an organic compound, why not call in an Ansul specialist? It actually isn't necessary to start at the "beginning." Methylation has been a specialty of ours since 1936. The experience we have gained by methylating more than 100 compounds during the last 18 years is at your disposal to help solve your particular problem.

Our methylation laboratory is equipped to take over your methylating problem at *any stage of development* and come up with a practical answer. We have manufacturing facilities for producing commercial quantities of a methylated compound to your specification.

Ansul is a major producer of methyl chloride and prepared to supply you with quantities ranging

from laboratory cylinders to tank car lots. Our methyl chloride is available in cylinders of 100 lbs., 140 lbs., and 1300 lbs., and tank cars of 40,000 lbs. and 78,000 lbs. Delivery is prompt.

Address your correspondence to the head of our methylation laboratory, Dr. T. R. Patterson, ANSUL CHEMICAL COMPANY, Dept. C-35, Industrial Chemicals Products, Marinette, Wisconsin.



When inquiring check CP 6102 opposite last page

## Materials—Feature Section

### new chemicals — 172 to 184

(Continued from preceding page)

**172) DRY BLENDING VINYL RESIN** — Pliovic DB80V can be compounded on conventional mixing equipment, is heat-stable, easily molded or extruded. Dry, free-flowing resin is 100% polyvinyl chloride. Goodyear Chem.

**173) DRY BLENDING VINYL RESINS** — Pliovic resins are dry blending polyvinyl chloride resins. EDB-90V has good electrical properties, ease of processing. Intended for all electrical uses where vinyls are acceptable, such as wire insulation. Resin DB90V is same as above, except for electrical properties. Goodyear Chem.

**174) DYE CARRIER** — Ketosol Solvent 75 is used as a dye carrier for synthetic fibers and formulated dye carriers with *o*-phenyl phenol or  $\beta$ -naphthol. Dyes can be applied from neutral, alkaline, acid baths. No after-scouring. Mixture: 75% phenyl methyl carbinol, 25% acetophenone. BP: 202.4°. Sol: 2.4% in water. Union Carbide & Carbon.

**175) EMULSIFIABLE POLYETHYLENE** — A-C Polyethylene 629 can be used to make stable, clear emulsions as high as 30-50% solids. Suited for spray, water-phase applications in polishes, paper and fabric coatings. Melts: 205-208°F. Intermediate for inert coatings. Semet-Solvay Petrochem.

**176) EMULSIFIER FOR INSECTICIDES** — Toximul 500, nonionic-anionic blend, all-purpose emulsifier for chlorinated agricultural insecticides. Ninol Labs.

**177) EMULSIFIERS** — Avasols, series of emulsifiers, softening and dye fixing agents, purities from 40 to 100%. Alframine.

**178) 2,5-ENDOMETHYLENE CYCLOHEXYLMETHYL AMINE** — Cyclamine E8 used in preparation of oil demulsifiers, corrosion inhibitors, surface-active agents, oil additives, rubber chemicals.  $C_6H_{11}NH_2$ . BP: 185.9°. Sets to glass below -90°. Sl. sol: water. Exp. Union Carbide & Carbon.

**179) EPICHLORHYDRIN** — An acid-acceptor for stabilizing chlorinated solvents. Makes epoxy resins, pharmaceuticals, ion exchange resins, specialty detergents. BP: 115.2°. Freezes: -58°. Union Carbide.

**180) EPICHLOROHYDRIN** — 98%  $C_2H_4ClO$ . BP: 115.0-117.0°. MP: -57.15°. Stabilizer; intermediate for epoxy resins, surface-active agents, plasticizers. Dow Chemical Co.

**181) EPOXY PLASTICIZER** — PX-800 Epoxy plasticizer imparts oil, soap resistance to polyvinyl chloride resin compounds. Pittsburgh Coke.

**182) EPOXY RESIN** — Moisture-resistant Scotchcast electrical insulation resin No. 3 is epoxy-type, two-part liquid. Hermetically seals electrical equipment. 3-5 day pot life. Cure: 2-4 hr @ 250°F. Minnesota Mining.

**183) ERUCYL ALCOHOL** — Adol 22 has 88% purity, boiling range of 334-376°. For lubricants, textile applications, surface-active agents. Chemically stable. Cloud point: 81°F. Pilot plant. A-D-M.

**184) ESTERSIL** — Estersil GT is used as thickening agent for multipurpose greases. Composed of 10 $\mu$  spheres of amorphous silica joined into highly porous networks made by water-repellent by esterification of silica surface with a monohydric alcohol. Available as loose pellets. Greases are made by an entirely mechanical process, non-melting, water-resistant, mechanically and oxidation stable, show little consistency change with temp. DuPont.

(Continued on page 46)



**Preplasticized emulsions  
of polyvinyl acetate  
offer cost savings . . .**

higher solids content permits  
inventory reduction

Custom preplasticized polyvinyl acetate emulsions of 55% solids are available. By purchasing a plasticized product, user eliminates plasticization step in his manufacturing operation, realizes certain cost savings as well as reduction in space requirements and inventory, since product has higher solids content. Price structure is reported to be very favorable.

(Preplasticized PVA emulsions are a product of Polyco Dept., Chemical Div., The Borden Co., Dept. CP, 101 Foster St., Peabody, Mass. . . or for more information check CP 6103 on handy form opposite last page.)

**Practical information  
on paint driers**

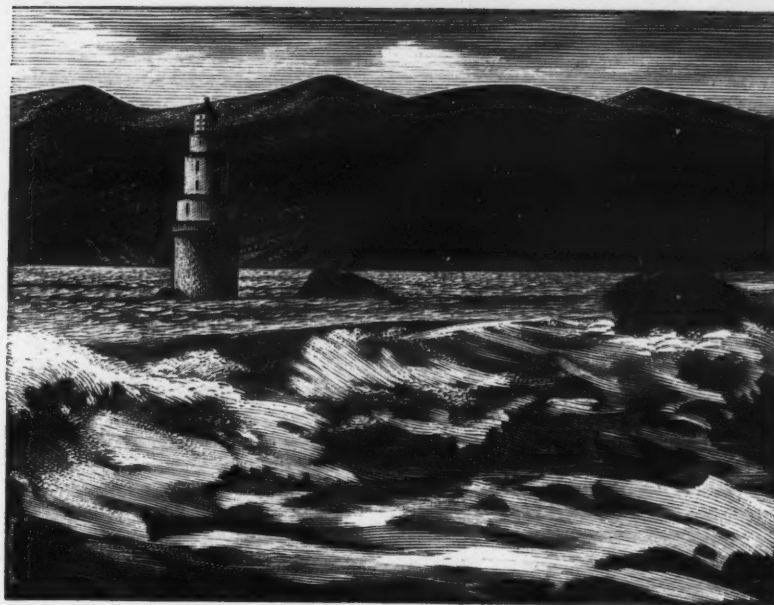
Data in 32-page brochure have been compiled with one fundamental premise in mind — to give technical men working with drying oils and resins practical information on the selection and use of driers. Typical properties of a variety of chemical driers for use in paints, varnish, printing ink, and other products are detailed.

A section on drier specs and standards, suggestions for handling and selecting driers are also given.

Brochure D 4036 is issued by The Harshaw Chemical Co., Dept. CP, 1945 E. 97th St., Cleveland 6, Ohio. When inquiring reader may simply specify CP 6104 on handy form opposite last page.

For more information on product at right, specify CP 6105 . . . see information request blank opposite last page. ➤

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*MILE ROCK LIGHT guards the south side of the channel leading through the Golden Gate into San Francisco Bay, one of the world's finest land-locked harbors. The lighthouse, built on top of Mile Rock, is constructed of steel and concrete upon a massive monolithic concrete base 34 feet high. The top of the beacon is 90 feet above mean low water. On the opposite side of the Golden Gate is Point Bonita Light.*

**Something to steer by** for users of electrochemicals are the standards of quality and service set by Niagara Alkali Company. Many leading manufacturers depend, with the confidence of long experience, upon Nialk® Liquid Chlorine, Nialk Caustic Potash, Nialk Carbonate of Potash, Nialk Paradichlorobenzene, Nialk Caustic Soda, Nialk TRICHLORethylene, Niagathal® (Tetrachloro Phthalic Anhydride)

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## Dependable Source for Chemical Raw Materials



Edwin M. Ross, manager of production division, W. H. & L. D. Betz, Philadelphia, nationally known chemical engineers and consultants.

## "Plurionics have definitely been an aid to us in water conditioning"

— W. H. & L. D. Betz, Philadelphia, Pa.

Industrial water conditioning is an exacting service business with a big future. W. H. & L. D. Betz, chemical engineers and consultants, Philadelphia, have been prominently identified with this business since 1925.

Each year, Betz mixing and formulating plants, in Philadelphia, Texas, California and Montreal, blend thousands of "prescriptions," each formulated to solve some individual water-conditioning problem for industry. These plants actually perform the function of a giant pharmacy. They are the focal point of Betz engineering skill and experience.

"In our prescriptions we use many ingredients," says Edwin M.

Ross, manager of the Betz production division. "We are continuously testing new products that may help us improve our services to industry. Recently, we tested the Plurionics, Wyandotte's nonionic surface-active agents. As a result, we are now using the Plurionics in certain areas of our water-conditioning service. They have definitely been an aid to us in solving water-conditioning problems."

Have you investigated Wyandotte's Plurionics\* for your products? They offer a combination of vital properties which cannot be duplicated in any other single non-ionic surfactant; the Plurionics are the most versatile agents of their type available today.

For complete technical data on the Plurionics, or on our other organic and inorganic chemicals, write us, stating your problem. We will be pleased to cooperate with you. Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.

\*REG. U.S. PAT. OFF.

**HEADQUARTERS FOR ALKALIES**

Soda Ash • Caustic Soda • Bicarbonate of Soda • Chlorine  
Calcium Carbonate • Calcium Chloride • Chlorinated Solvents  
Glycols • Anionic and Nonionic Detergents • Agricultural  
Insecticides • Other Organic and Inorganic Chemicals

When inquiring check CP 6106 opposite last page

## Materials—Feature Section

### new chemicals — 185 to 212

(Continued from page 44)

**185) ETHOXYMETHYLENE-MALONONITRILE** — BP: 156-157° @ 15 mm.  $C_6H_5OCH_2(CN)_2$ , 99% min. Pharmaceutical, pyrimidine, dye intermediate. Exp. Kay-Fries Chemicals.

**186) ETHYL BENZENE** — Solvent for vinyl-type polymerizations; preparation of anthraquinone, styrene, pharmaceuticals, dyestuffs. High purity: < 0.3% benzene, 0.17% (max) diethyl benzene, no free acid. Max color: —15 (Pt-Co). BP: 136.2°. Union Carbide.

**187) N-ETHYL CYCLOHEXYLAMINE** — Alkaline organic solvent, extractant for acidic materials, acid acceptor. For pharmaceuticals, rubber chemicals, corrosion inhibitors.  $C_6H_5NHC_2H_5$ . BP: 164.9°. Freezes: —43.6°. Sl. sol: water. Sol: organics. Union Carbide.

**188) ETHYL ETHOXYMETHYLENE CYANOACETATE** — Intermediate for pyrimidine, pharmaceuticals, dyes. Purity: 99% min. BP: 150° @ 6 mm. Exp. Kay-Fries Chemicals.

**189) 3-(2-ETHYLBUTOXY) PROPIONIC ACID** — For preparation of metallic salts for paint driers, gelling agents. Can make high-mw esters for detergents, emulsifiers, plasticizers.  $C_6H_5OC_2H_4COOH$ . BP: 200° @ 100 mm. Sets to glass below —90°. Sl. sol: water. Union Carbide & Carbon.

**190) ETHYLENE GLYCOL DIBENZOATE** — Benzoflex E-60 imparts low moisture impermeability to hot melt coatings and adhesives. Min purity is 98%. Insol: water, aliphatics. Sol: aromatics. MP: 70-72°C. Exp. Tennessee Products.

**191) ETHYLENE GLYCOL ETHYL ETHER** — Dowanol 8. Makes solvents, plasticizers.  $C_4H_{10}O_2$ . BP: 132.5-135.5°. Dow Chem.

**192) ETHYLENEDIAMINE ANHYDROUS** — 99.0% (min)  $C_2H_8N_2$ . Intermediate for wetting agents, pharmaceuticals, sequestering agents, dyes, rubber accelerators. Boils in 2° range to include 117.3°. Dow Chem.

**193) ETHYLENEDIAMINE DIHYDROBROMIDE** — An experimental untried chemical.  $C_2H_8Br_2N_2$ . Dow.

**194) ETHYLENEDIAMINE TETRAACETONITRILE** — ETDN is 95% (min)  $C_8H_{12}N_4$ . MP: 131-133°. White to cream powder. Versatility of reactions suits it for organic syntheses. Sol: hot water, acetone, hot ethyl acetate. Insol: naphtha, toluene. Glyco Products.

**195) N-2-ETHYLHEXYL ANILINE** — Derivatives show better hydrocarbon solubility, lower volatility than those of lower alkyl anilines. Uses: as solvent; acid acceptor; making dyestuffs, pigments, corrosion inhibitors, oil additives, pesticides, rubber and textile chemicals.  $C_6H_5NHCH_2CH(C_2H_5)C_6H_5$ . BP: 194° @ 50 mm. Sets to glass below —70°. Sl. sol: water. Union Carbide.

**196) N-2-ETHYLHEXYL CYCLOHEXYLAMINE** — Is an extractant for acidic materials, acid acceptor, alkaline organic solvent. Making pharmaceuticals, rubber chemicals, corrosion inhibitors.  $C_6H_5CH(C_2H_5)CH_2NHC_6H_{11}$ . Sets to glass below —90°. Boils at 270.3°. Sl. sol: water. Sol: organics. Union Carbide.

**197) 2-ETHYLHEXYL OCTYLPHENYL PHOSPHITE** — Mixed compound used as stabilizer in vinyls, esterifications, and GR-S rubber. Insol: water. Sol: common organics. Tech. Offers combination of alkyl, aryl properties of trivalent phosphorus esters. Virginia-Carolina.

**198) 1-ETHYNYLCYCLOHEXAN-1-OL** — For stabilization of chlorinated organics; the carbonate is hypnotic.  $C_6H_{10}(OH)CCH$  boils at 180°, melts at 30-31°. 95% purity. Sl. sol: water. Sol: most organics. Air Reduction Chem.

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199) **EXTENDERS** — Silvacons, derived from Douglas fir bark, for loading phenolic molding compounds and rubber products, adhesive extender, ingredient in vinyls, foundry sand, asphaltic products. Functions chemically and physically, has low sp gr. Weyerhaeuser.

200) **FATTY AMIDE** — 100%-active liquid fatty amide, Nopco 1479-D, used in scouring wool, worsted fabrics. Stable with high concentrations of soda ash. Water-soluble with copious foam. Nopco Chem. Co.

201) **FATTY AMIDE CONDENSATE** — Sulfanole LAN, cosmetic grade, is used in cosmetic preparations. Purity: 100%. Water soluble. Warwick Chem.

202) **FATTY AMINE SOAP** — Nopcohex, a 100%-active fatty amine soap, finds use as a corrosion inhibitor with mineral oil in sloughing compounds. Compound has excellent water displacement properties, is water insoluble, mineral oil soluble. Nopco Chem. Co.

203) **FATTY AMIDO COMPOUND** — Antaron FC-34 is fulling agent for woolen, worsted fabrics. Surface-active agent for cosmetic uses, detergents, dedusting soaps. 40%-active. Amphoteric, high foaming. General Aniline — Antara.

204) **FATTY AMIDO COMPOUND** — Soromine AT, an amphoteric softening agent for animal, cellulosic, synthetic fibers. Does not discolor whites, adversely affect dyed fabrics. 20%-active. General Aniline — Antara.

205) **FERROUS FLUOSILICATE** —  $\text{FeSiF}_6 \cdot 6\text{H}_2\text{O}$ . Tech. CP. Sol: water. Exp. City Chem. Corp.

206) **FIRE-RESISTANT POLYESTER RESINS** — Hetron Resins make fire-resistant impregnants for glass fiber-reinforced sheets, tubes, housings, automobile bodies, boats. Fire-resistance permanent, is chemically built in. Physical properties are superior. Hooker Electrochemical.

207) **FLAME-RESISTANT AGENT** — Nylon No-Glow, used with amine-aldehyde resin, retards complete combustion, imparts flame-resistance with no after glow. Esp. for nylon fabrics. Chem. Products.

208) **FLOCCULATING AGENT** — Separan 2610. Sol: water. Flocculating agent, coagulant. Dow Chem.

209) **2-FLUOROETHANOL** — Soluble in many organics, compound finds application in fungistatic plasticizers and solvents. 95%  $\text{FCH}_2\text{CH}_2\text{OH}$ . BP: 99-104°. Very toxic. Jasonols.

210) **FORMIC ACID** — Anhydrous  $\text{HCOOH}$  has purity >99%. MP: above 8°. BP: 101°. Uses: Petroleum refining, organic syntheses. Exp. Victor Chem. Works.

211) **FUMAROYL CHLORIDE** — 96.5+% ( $\text{ClCOCH}_2\text{CH}_2\text{COCl}$ ) as intermediate for pharmaceuticals, dyestuffs, insecticides. BP: 161-164°. Exp. National Aniline.

212) **FUNGICIDES** — Formulations of N,N'-di(dimethylaminothiocarbonylsulphidryl)  $\Delta^4$  tetrahydrophthalimide, Socci #5514-L is a fungicide specifically for polyvinyl acetate emulsion paints. #5514-P is a fungicide for oleoresinous exterior paints. Scientific Oil Comp.

(Continued on page 50)

UNLESS OTHERWISE SPECIFIED . . .

- 1) Commercial quantities are available ("Exp" indicates otherwise)
- 2) Pressures are in mm of mercury (abs.)
- 3) Boiling points are at 760 mm
- 4) Temp is in °C
- 5) Solubilities are at "room temp"



## What are your catalyst carrier applications?

*Norton engineered and prescribed carriers offer you important processing advantages*

What do you need? An inert, high alumina carrier for fixed bed oxidation reactions — such as those involved in the manufacture of phthalic anhydride, maleic anhydride and ethylene oxide?

An inert, low density carrier for use as a space filler or tower packing?

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ALUNDUM carriers are commercially available in the form of spheres, rings and pellets. Also available in experimental quantities are carriers made of MAGNORITE\*, CRYSTOLON\*, Fused Stabilized Zirconia and Kyanite materials.

### ALUNDUM Spherical Carriers

provide uniform beds in catalytic converters, reducing channeling and pressure drop to a minimum. Medium porosity spheres (40%-44%) have a network of open pores on the outside surface only. These are specifically recommended for applications where the carrier is coated with a catalyst. High porosity spheres (45%-49%) have an internal as well as external network of pores, and are suitable for applications where the carrier is impregnated with a catalyst.

### Other Norton Refractories

for chemical processing include porous mediums, laboratory ware, ALUNDUM, MAGNORITE, CRYSTOLON, and Fused Stabilized Zirconia shapes. All are engineered and prescribed to give you the best possible R — the most effective combination of physical

characteristics plus thermal, chemical and electrical properties. For details call in your Norton Refractories Engineer, or write, mentioning your specific requirements to NORTON COMPANY, 563 New Bond St., Worcester 6, Mass. Canadian Representative: A. P. Green Fire Brick Co., Ltd., Toronto, Canada.

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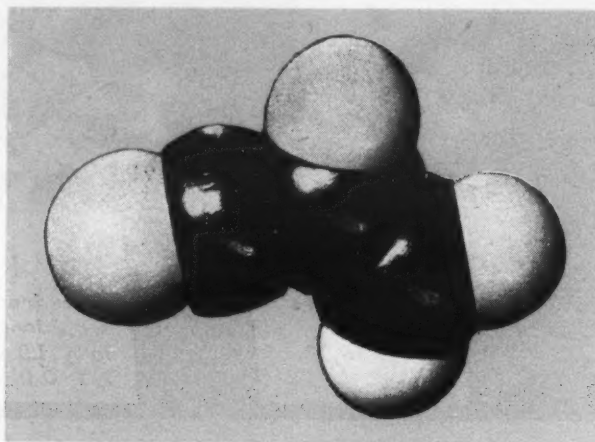
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When inquiring check CP 6107 opposite last page

The number and variety of useful derivatives that can be made from acrylonitrile is startling. The chart on which the molecular models rest in the cover photograph lists almost 200 products that can be made by cyanoethylation, nitrile, or olefinic reactions. Here's the story of five of these products.



## Acrylonitrile and derivatives —



## building blocks for useful products

Parent chemical, acrylonitrile, is made by reacting acetylene and hydrocyanic acid in presence of a liquid phase catalyst. Acrylonitrile is available commercially and is used as an ingredient in synthetic fibers such as Acrilan and Orlon, in synthetic rubber (Buna N), and insecticides, as a parent chemical for copolymer resins, coatings, and adhesives, and in organic syntheses to make additional chemical intermediates. It is these intermediates — available in commercial quantities later this year — about which we concern ourselves.

**Succinonitrile** — further treatment with HCN in a basic medium yields succinonitrile,  $(CH_2CN)_2$ , an odorless, somewhat hygroscopic solid. Considerable commercial interest exists in reduction to tetramethylenediamine, an intermediate for polyamide and polyurethane fiber. A number of methods can be used (such as Zn + HCl, Na and ethanol, electrolysis, and  $H_2$  over Ni or Co catalyst). However, best yields are given by catalytic hydrogenation over Raney cobalt in presence of large excess

of anhydrous ammonia. The co-product, pyrrolidine, suggests application as an intermediate for dyestuffs, pharmaceuticals. It should also prove a lower cost replacement for piperidine in rubber accelerators and agricultural chemicals.

Other reactions include those with water (with acid catalyst) to give succinamide, succinimide, or succinic acid. The nitrile also reacts with a number of other organics (including alcohols, mercaptans, dicyandiamide), and can be chlorinated and oxidized.

End uses of these derivatives are in fibers, plastics, resins, disinfectants, textile treating agents, rubber chemicals, and agricultural toxicants. In addition, succinonitrile itself should find use as an absorbant for countercurrent extraction of polar compounds from hydrocarbon solutions. It makes a superior antistatic agent for photographic films, and with organic carriers, it brightens electroplated nickel.

**$\beta$ -Chloropropionitrile**,  $ClCH_2CH_2CN$ , made by treating acrylonitrile with anhydrous HCl, suggests use as an intermediate for resins and pharmaceuticals, and as a brightener for nickel plating.

The chlorine atom is activated by the nitrile group and is easily replaced. High temperatures or presence of bases demuriates the compound to acry-

TABLE OF PHYSICAL PROPERTIES  
Acrylonitrile and Derivatives

Compound	Purity as supplied (% by wt)	Appearance at Room Temp	Boiling Point ( $^{\circ}C$ @ 760mm)	Crystal-izing point ( $^{\circ}C$ )	Density	Refractive Index ( $n_D^{25}$ )	Toxicity
Acrylonitrile		Colorless liquid	78.5	-82	0.8060 (20/4)	1.3884	Poisonous
Succinonitrile	99+	Colorless waxy solid	267	54	1.022 (25/4)	1.4147 (@ 63 $^{\circ}C$ )	Moderately toxic
$\beta$ -Chloropropionitrile	98+	Colorless liquid	176 d.	-52	1.136 (25/4)	1.434	Highly, if ingested
$\beta$ -Chloropropionic acid	99+	White crystalline solid	204 d.	40.7	1.235 (100/4)	1.4368 (@ 46 $^{\circ}C$ )	Causes severe burns
$\beta$ -( $\alpha$ -Chloroanilino) propionitrile	(Experimental)	Colorless liquid	139-141 (@ 0.3 mm)	3	1.2103 (25/25)	1.5734	(not determined yet)
$\beta$ - $\beta'$ -Oxydipropionitrile	90+	Colorless to pale yellow liquid	140 (@ 3 mm)	-27	1.041 (30/4)	1.4420	Slightly toxic
$\beta,\beta'$ -Thiodipropionitrile		Colorless to pale yellow liquid	181-185 (.05% @ 3mm)	$\alpha$ -28 $\beta$ -22	1.1155 (25/4)	1.5025	Slightly toxic



lonitrile. Other than these, typical nitrile reactions are exhibited.

$\beta$ -Chloropropionic acid is made by treating above compound with  $H_2SO_4$  and hydrolyzing. Uses that have been tried include a starting material for resins, surface-active agents, herbicides, and other organics. The carboxyl group activates the chlorine atom. With  $SO_3$ , the chemical is converted to sulfoacrylic acid. Acrylic acid is produced by demurination. Typical reactions are exhibited on esterification or other reactions of the carboxyl group.

$\beta$ -(o-Chloroanilino) propionitrile is available in experimental quantities. The compound,  $ClC_6H_4NHCH_2CH_2CN$ , undergoes typical nitrile reactions, is hydrolyzable to the acid and forms other derivatives. Salts can be formed by the basic nitrogen atom.

$\beta,\beta'$ -Oxydipropionitrile,  $O(CH_2CH_2CN)_2$ , has been hydrolyzed by treatment with aqueous mineral acids to  $\beta,\beta'$ -oxydipropionic acid. Saturated esters of the diacid are suggested for use as plasticizers. The diallyl ester has been tried in polyester copolymers. Alcoholysis of dinitrile forms esters.

Condensation of this compound with formaldehyde gives polyamides of methylenediamine. Hydration with alkaline peroxide forms  $\beta,\beta'$ -oxydipropionamide. Catalytic hydrogenation forms  $\gamma,\gamma'$ -oxydipropylamine.

Attention should be directed to specialty solvent uses. Compound has been shown to be an excellent selective solvent for countercurrent extraction of aromatics from aliphatic hydrocarbons.

$\beta,\beta'$ -Thiodipropionitrile, the sulfur homologue of above compound, is formed by treatment of acrylonitrile with  $H_2S$  (or  $Na_2S$ ) instead of water at high pH. Similar to oxydipropionitrile above, it is a highly selective solvent for countercurrent extractions of aromatics from paraffins. Phase equilibria investigations of n-heptane-aromatic systems confirm that these two nitriles are similar in capacity and selectivity for aromatics and that both are superior to diethylene glycol in respect to these properties.

The diacid, formed by hydrolysis, is an antioxidant and preservative for fats and edible oils, vitamin  $B_{12}$  solutions, animal feeds, soap products, and cereals. Higher alcohol esters suggest use as components of synthetic lubricants, lithium-base EP greases, polyethylene stabilizers, and plasticizers for polyvinyl chloride. Condensation product with hydrazine is a brittle polymer, softening at  $110^\circ C$ . With formaldehyde, substantially-linear polyamides of methylenediamine are obtained. Thiodipropionitrile can also undergo oxidation or hydrolysis.

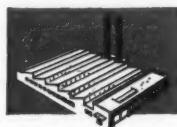
(Acrylonitrile derivatives are available on semi-works scale from Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 800 N. Twelfth Blvd., St. Louis 1, Mo. . . or for more information check CP 6108 on form opposite last page.)

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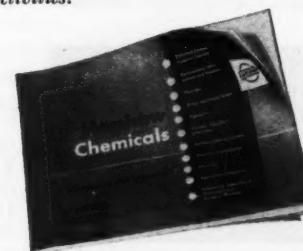
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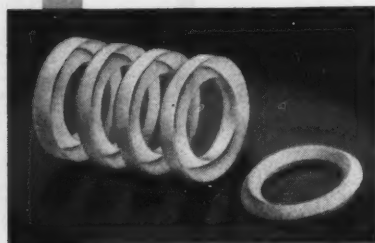
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- ▶ won't deteriorate
- ▶ won't "freeze" shaft action



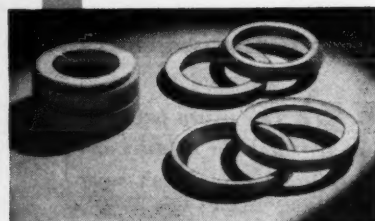
### V-TYPE PACKING

Chemiseal Type 810 TEFLON V-Packing for use in manual, air or motor operated valves. Construction and distinctive tapered V design offers chemically impervious service and greater flexibility and resiliency, providing necessary seal at low gland pressure and reduced torque on valve stem.



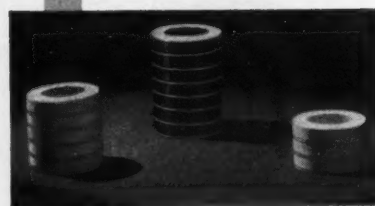
### CUP AND CONE TYPE PACKING

Chemiseal Type 810-W TEFLON Packing for both hand and mechanically operated valves. Cones deform inwardly to effect a seal at the spindle, while cups expand outwardly against stuffing box wall, making possible a tight seal at low gland pressure.



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## Materials—Feature Section

new chemicals — 213 to 237

(Continued from page 47)

213) **GELLING AGENT** — Gelling agent for aq. systems where permanent thickening or suspension is required, such as cosmetic preparations, polishes, textile finishes, water emulsion paints. Only 1-5% is required. Ben-A-Gel is a highly beneficiated hydrous magnesium silicate. National Lead.

214) **GENERAL PURPOSE RESIN** — PVC-45 resin is readily processed at reduced temp. For molding, extrusion, calendaring. Has good electrical properties, heat stability. Can be dry blended. Diamond Alkali.

215) **GLUCURONOLACTONE** — A modifier for established drugs, esp. from standpoints of toxicity, solubility, rate of absorption. Corn Prod. Sales.

216) **GLUTARALDEHYDE** — 30% aq. soln used for insolubilization of polyhydroxy compounds and proteins; treatment of textiles for shrink- and crease-resistance; treatment of paper for water-resistance.  $\text{OHCC}_2\text{H}_4\text{CHO}$  boils at 101°, freezes at -6.3°. Exp. Union Carbide.

217) **GLUTARIC ANHYDRIDE** —  $\text{OC}(\text{CH}_2)_2\text{COO}$  for polyester resins and plasticizers; making salts, esters, amides. BP: 287°. MP: 56°. Exp. Union Carbide.

218) **GLYCERIC ACID** — Purity: 95%. For organic and biochemical syntheses.  $\text{HOC}_2\text{H}_4\text{OHCOOH}$ . Fisher.

219) **GLYCERINE CARBONATE** — An intermediate for glycidol production and an extractive solvent. 98% purity. Formula:  $\text{HOCH}_2\text{CHCH}_2\text{OCOO}$ . Toxicity: low. Boils at 125-130° @ 0.1-0.2 mm. Exp. Jefferson.

220) **GLYCEROL MONOOLEATE** — Myverol Type 70 Distilled Monoglycerides have chemical formula  $\text{C}_{17}\text{H}_{33}\text{COOCH}_2\text{CHOHCH}_2\text{OH}$ , purity of 90-95% as monoglyceride (100% as active material). Used as viscosity reducer, stabilizer for alkyd resin odorless thinner systems, emulsifier for water-in-oil emulsions, solubility modifier. Soft grease at room temp, non-toxic. Sol: ether, acetone, ethanol, trichloroethylene, Skellysolve B. Distillation Products Industries.

221) **GLYCINE AMIDE HYDROCHLORIDE** — Called GAH. Used to prepare antibiotics, antihistamines, pharmaceuticals, germicides, resins, intermediates. Formula:  $\text{H}_2\text{NCH}_2\text{CONH}_2 \cdot \text{HCl}$ . White solid melts at 178-184°. Sol: water, ethanol. Insol: most aromatics. Has two reactive functional groups, active methylene group. Commercial and pure grades. Jasonols.

222) **GLYCOLLIC ALDEHYDE** — 99%  $\text{HOCH}_2\text{CHO}$  is of interest in biochemical research. Melts at 95-97°. Toxicity unknown. Jasonols.

223) **GRAPHITE DISPERSION** — Dag Dispersion No. 213 is colloidal graphite in epoxy resin solution. Durable and corrosion-resistant. Acheson Colloids Co.

224) **GUANIDINE HYDROCHLORIDE** —  $\text{CH}_6\text{N}_5\text{HCl}$  tech. Purity: >88.8%. MP: 175-180°. Use: source of free guanidine. Irritating. American Cyanamid.

225) **HARD EPOXY RESINS** — For coating formulations, resin series provides flexibility, chemical resistance, good adhesion properties. These epoxies are offered for cooking, cold cutting, in soln or as finished esters. Approx. equivalent weights are 130 for Epi-Rez 520, 160 for Epi-Rez 522, 175 for Epi-Rez 530, 190 for Epi-Rez 540, and 200 for Epi-Rez 550. MP range from 65° to 155°. Jones-Dabney.

226) **HEAT SEAL LAMINANT** — C 510. For bonding vinyl film to fabric, making heat-seal tapes, patches. Spreader-applied heat seals bond at 300-350°F, possess excellent flexibility and strength. Am. Resinous Chem.

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opposite last page

CHEMICAL PROCESSING

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227) **HERBICIDE** — Experimental Herbicide DCU has active ingredient of dichloral urea. Wettable powder: 73%-active; dust concentrate: 80%-active. Toxicant for germinating grass seeds, seedlings. Exp. Union Carbide.

228) **HERBICIDE** — Experimental Herbicide Natin has 2,4,5-trichloro-phenoxy-ethyl sulfate as active ingredient. Water-sol powder is 80%-active. Germative seed toxicant controls broad leaved and grass weeds. Exp. Union Carbide.

229) **HEXACHLOROBUTADIENE** —  $C_4Cl_6$ . Available as a chemical intermediate. Dow Chem.

230) **HEXADECENE/OCTADECENE MIXTURE** — Isomerized olefin #3869-A has formula  $R_2HCCH_2R$ . BP: 115-135° @ 3 mm. Cloud point: 36°F. Excellent solubility. Chemical reagent; makes textile surface-actives, petroleum additives, plastics, polymers. Semi-commercial. A-D-M.

231) **n-HEXADECENE/n-OCTADECENE MIXTURE** — Alpha Olefin #3877-A. General formula:  $R-CH_2CH_2R$ . Boils: 128-158° @ 7.5 mm. Melts: 9°. Excellent solubility. Chemical reagent; makes petroleum additives, textile surface-active agents, plastics, polymers. Semi-commercial. A-D-M.

232) **HEXADECYL ALCOHOL** — Cachalot cetyl alcohol C-51 is intermediate for flotation reagents, emulsifiers, oil additives. Low-cost tech grade has max lot-to-lot uniformity. Sol: aromatics. Melts: approx. 51°. Toxicity: no known adverse findings. Michel & Co.

233) **HEXAHYDRO PHTHALIC ANHYDRIDE** —  $C_8H_{10}O_3$ . Purity: 99% + total acidity as hexahydro phthalic anhydride. BP: 158° @ 17 mm. Solidifies: 35-36°. Sol: petroleum ether. Sol: common organics. Uses: intermediate for plasticizers, insecticides, insect repellants, rust inhibitors. Exp. National Aniline.

234) **HIGH ALUMINA CATALYST** — Aerocat Triple A fluid cracking catalyst maintains 15-25% higher equilibrium activity than 13%-alumina catalyst. Lower stack losses, high attrition resistance. Excellent selectivity. American Cyanamid.

235) **HYDRATED SILICA** — Hi-Sil X303 has high purity, average particle size of 22 $\mu$ . Reinforcing filler for silicone rubbers. Shows promise in plastics, coatings, greases, inks, textile treatments, cosmetics, pharmaceuticals. Easy processing. Low water absorption. Pittsburgh Plate Glass.

236) **HYDRAZINE TARTRATE** —  $C_2H_8O_4 \cdot N_2H_4$ . Purity: >95%. MP: 180-200°. Use: formation of protective copper coating on back of silver mirrors. Speeds up, simplifies manufacture. Merck.

237) **HYDROCARBON RESIN** — Panarez 16-21 for rubber compounding, floor tile, adhesives. Hydrocarbon resin is low cost, of light color and low iodine number. Sol: hydrocarbons. MP: 200-220°F. Exp. Pan American Chemical.

(Continued on next page)



"Check this for toxicity, will you, Ed?"

# Caustic Soda—

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1. Your caustic soda freight rate.
2. Your facilities for handling caustic.
3. The amount of caustic you use.

### Advantages of 73% liquid

1. With 73%, there is a substantial saving in freight charges. 63% less water is shipped per unit weight of dry caustic soda.
2. You will place fewer orders. This cuts down on your billing work.

### Disadvantages of 73% liquid

1. It is priced \$2.00 more per ton (dry basis) than 50% because of higher manufacturing costs.
2. If you store it as 73% liquid, you will need heated, nickel-clad steel storage tanks.
3. If you dilute 73% to 50% while unloading, you will need a cooler and other equipment. This represents a considerable investment which can be reduced if you have

suitable equipment already on hand.

Use this table to see if you can save with 73%

Use the table at right to find your approximate saving on freight charges with 73% liquid caustic. The table balances two cost factors . . . lower freight charges and the higher initial price of 73% liquid caustic.

To estimate your yearly savings, multiply the figure in the right-hand column which applies to you by your annual consumption in tons (dry basis).

From these savings you will have to deduct the cost of equipment for diluting to 50% while unloading.

Freight rate per hundred weight in cents (including taxes)	Net savings per ton (dry basis) in dollars
5	minus 1.40
10	minus .80
15	minus .10
16	0
20	.60
25	1.20
30	1.80
35	2.40
40	3.00
45	3.70

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"CAUSTIC SODA BUYER'S GUIDE" is the title of a new pocket-size booklet we will be glad to send you. Contains helpful facts on the economics of 50% and 73% solutions; other forms of caustic soda; capacities of tank cars and other containers; useful shipping information. Write for a copy.



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From the Salt of the Earth—1955

**HOOKEE ELECTROCHEMICAL COMPANY**

13 Forty-seventh Street, Niagara Falls, N. Y.

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When inquiring check CP 6112 opposite last page

new chemicals — 238 to 262

(Continued from preceding page)

**238) HYDROCARBON RESIN ACID EMULSION** — Resin Emulsion #5021 is non-ionic, used as additive to emulsions having pH lower than 7. Specific for improving film characteristics of polyvinyl acetate paints. Scientific Oil Comp.

**239) HYDROCARBON WAX DISPERSIONS** — Water-dispersible hydrocarbon wax dispersions, Nopco 1055 and 1155 Wax Sizes, are used in paper coating, cotton fabric finishing. Alum- and acid-stable, they are 50%-active. Nopco Chem. Co.

**240) HYDROQUINONE MONOMETHYL ETHER** — Non-discoloring antioxidant. Low toxicity. 99+-%  $\text{CH}_3\text{OCH}_2\text{C}_6\text{H}_4\text{OH}$ . BP: 246.0°. MP: 53-54°. Sl. sol: water, ethyl acetate. Sol: many organics. Ansul.

**241) p-HYDROXY ACETOPHENONE** —  $\text{C}_8\text{H}_8(\text{OH})\text{COCH}_3$  has min purity of 99%. Melts: 109°. Sol: alcohol, ether. Sl. sol: water. Exp. Kay-Fries.

**242) 3-HYDROXY BENZALDEHYDE** — 94%  $\text{C}_7\text{H}_6\text{O}_2$ . For organics, especially pharmaceuticals. MP: 101.5°. Sol: hot water, aromatics. National Aniline.

**243) HYDROXYETHYL CELLULOSE** — Cellosize WP-3 is used as protective colloid and thickener for textiles, cosmetics, paints, adhesives, ceramics; stabilizer and thickener in polyvinyl acetate and other synthetic resin emulsions. Nonionic. Compatible in soln with dissolved electrolytes. Aq. soln does not gel even at high temp. 5% aq. soln has viscosity of 250-350 cps @ 20°. Union Carbide.

**244) HYDROXYETHYL CELLULOSE** — Cellosize WP-09 is a water-soluble, film-forming agent and colloidal stabilizer for use in textiles, plastics, cosmetics, paints, adhesives, ceramics; stabilizer for emulsion polymerization of vinyl acetate, other monomers; protective colloid, thickener in final resin emulsion. Nonionic, it is compatible in soln with dissolved electrolytes. Aq. soln does not gel even at elevated temp. Viscosity of 5% aq. soln at 20°C: 50-150 cps. Union Carbide and Carbon Corporation.

**245) HYDROXYLAMINE SALTS** — Powerful reducing agents for cuprous ion method of dyeing acrylics, and for analytical use. For non-discoloring 'short-stoppers' in synthetic rubber production. Forms oximes which are antioxidants, stabilizers, antiskinning agents. Hydroxylamine available as acid sulfate, neutral sulfate, and chloride. Commercial Solv.

**246) HYDROXYLAMMONIUM NITRATE** —  $\text{H}_2\text{NOH} \cdot \text{HNO}_3$ . Tech. 15% and 65% aq. solns. Reducing agent. Arapahoe Chem.

**247) HYDROXYLATED ORGANIC AMIDE** — Nopco GS #10 is a 100%-active hydroxylated organic amide. Water-soluble, used as extender or replacement for glycerine. Hygroscopic properties are equivalent to glycerine. Nopco Chem.



## NEW REACTIONS OF FATTY AMINES SHOW PROMISE FOR MANY APPLICATIONS

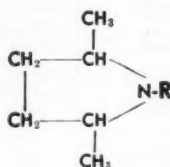
By Dr. M. R. McCorkle, Technical Director,  
Armour Chemical Division

Fatty amines are organic bases or "alkalis" made from fatty acids. They have only graduated from the laboratory in the past ten years. With the fatty amines commercially available, many chemists are looking at them with a great deal of interest.

It is the chemical versatility of the fatty amines which offers such great promise. Many of their desirable traits have been inherited from ammonia. Many new and useful characteristics have been added. The fatty amines are substituted ammonias and retain most of the reactivity of that compound. On the other hand, the long, normal alkyl groups derived from fatty acids impart additional desirable properties, such as surface activity, oil solubility, etc.

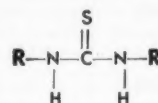
Recent laboratory work with the fatty amines has produced the reactions given below. These are only a few of the new applications, but they may serve to indicate how these versatile chemicals may be used. They are offered as signs pointing out roads that may be taken, but which have probably not yet been explored.

Primary amines will condense with acetyl acetone to form N-alkyl substituted 2,5-dimethylpyrroles which can in turn be reduced to the corresponding N-alkyl pyrrolidines.

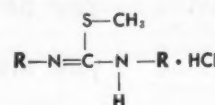


These alkylpyrrolidines are strong tertiary amines whose salts are cationic surface active agents. They are easily converted to quaternary ammonium compounds.

The primary fatty amines will react with carbon disulfide to form N,N'-dialkyl thioureas.

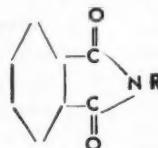


These substituted thioureas react with methyl chloride to give corresponding S-methyl isothiuronium hydrochlorides.



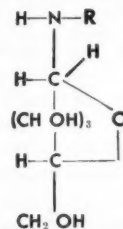
These sulfur-containing cation-active salts are slightly soluble or dispersible in water.

The primary amines will react with dibasic acids or their anhydrides to give the corresponding diamides or imides. For example, reaction with phthalic anhydride yields N-alkyl phthalimide.

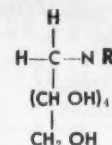


These products are wax-like in nature.

Glucose reacts with the fatty amines to form N-alkyl glucosylamines.



Hydrogenation of the glucosylamine yields N-alkyl sorbitylamine.



The basic reactions and properties of fatty amines are covered in our free booklet, "The Chemistry of Fatty Amines", which also lists all of our primary amines. If the reactions of any of these amines look interesting to you, samples are readily available.

### DIMETHYL TERTIARY AMINES

The Armour Chemical Division has developed two new dimethyl tertiary amines. This further supplements our line of high molecular weight aliphatic amines for industry. Designated as Armeen DMS and Armeen DM18, these products have the following configuration:



where R designates either soya (DMS) or stearyl (DM18). These materials are soluble (1 gm solute/1 gram solvent) in carbon tetrachloride, chloroform, acetone, benzene, isopropanol, tetrachloroethylene, mineral oil, VMP naphtha, ethyl acetate and methanol. A distilled grade of each of these chemicals is also available as Armeen DMSD and Armeen DM18D. Samples are available for your testing.

### ARMOUR CHEMICALS FOR SOAPS AND DETERGENTS

This booklet shows the wide range of efficient Armour fatty acids and derivatives for various soap products. It suggests economical fatty acids for bar and flake soaps, gel soaps, liquid soaps, textile scouring soaps, dry cleaner and oleic soaps and shampoos. A simplified method for calculating soap formulas is presented in chart form.

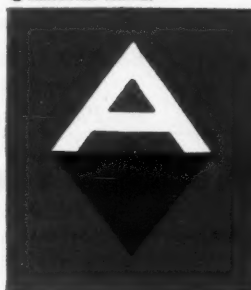
### COCONUT OIL FATTY ACIDS BOOKLET

The patented Armour fractional distillation process has made possible the separation of ordinary mixed coconut oil fatty acids into their pure component acids—with concentrations of above 92%. This booklet lists information and new applications for these high purity caprylic, capric, lauric, myristic, stripped and distilled coconut oil fatty acids. Send the coupon for both of these helpful booklets.

Use-index for all these products starts on page 80. See it first if you're after a chemical material for a specific use. It's cross-indexed with this list.

Manufacturer address list starts on page 82. Use it when writing for more information on materials which interest you.

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ARMOUR CHEMICAL DIVISION

ARMOUR AND COMPANY • 1355 WEST 31ST STREET • CHICAGO 8, ILLINOIS



## NEO-FAT® 16— HIGH PURITY PALMITIC ACID— SOLVES GREASE, COATING AND COSMETIC PROBLEMS

Palmitic acid concentrations of 93% are standard in Armour's Neo-Fat 16. High purity, exceptional color stability and other unique properties make Neo-Fat 16 an extremely versatile agent in a variety of industrial uses.

Neo-Fat 16's high melting-point, stability toward oxidation and quick saponification find application in the formulations of lubrication greases, waxes and buffing binders. In particular, Neo-Fat 16's quick saponification means faster formation of the soap base for producing greases. This provides economy in equipment and investment.

Soaps from Neo-Fat 16 are hard, slightly soluble at low temperatures and moderately soluble at elevated temperatures. They find primary application where lubrication, increased viscosity, hardness and emulsification are desired rather than detergency, foaming, etc. These fields include cosmetics and toiletries, metal working and finishing.

In detergents, Neo-Fat 16 contributes hardness and high temperature washing efficiency. As an emulsifying agent for creams and potassium soaps, Neo-Fat 16 is unusual in that normal temperature changes do not materially affect its solubility.

The metallic salts (Palmitates) of Neo-Fat 16 are effective thickening, suspension and fattening agents for protective coatings. Many derivatives of palmitic acid, such as alcohols, nitriles, amines, esters, etc., have also become important industrial chemicals. These include special esters used as plasticizers and textile lubricants, also cetyl alcohol used for the production of surface active chemicals such as wetting agents and additives for lacquers and varnishes.

Specifications for Neo-Fat 16 include a titer of 56 to 62, iodine value of 2 max., acid value of 216 to 220, unsaponifiable content, 0.5% max., moisture 0.5% max., and color Lov. 5¼" a max. of 1R-10Y. The average composition runs 93% Palmitic; 6% Stearic and 1% Oleic.

Neo-Fat 16 is available in flake form packed in 50-pound multi-wall paper bags and aluminum tank cars. Send the coupon today for free samples of Neo-Fat 16.

## BUILD NEW PRODUCTS WITH PURE CAPRYLIC AND CAPRIC ACIDS

The availability of Armour's high purity caprylic (Neo-Fat 8) and capric (Neo-Fat 10) acids should interest many processors working on new product development, particularly that involving organic synthesis.

These two coco fractions are available with purity of 92% or above. The average composition of Neo-Fat 8 is 93% caprylic, 4% capric, and 3% caproic. Neo-Fat 10 averages 92% capric, 5% lauric and 3% caprylic acids.

### SPECIFICATIONS

Neo-Fat 8: titer, 16°C. max.; iodine value 1 max.; acid value of 387 to 392; moisture and unsaponifiable content both 0.2%; and color, Lovibond 5¼", 2R to 20Y max.

Neo-Fat 10: titer, 28 to 33°C., iodine value 1 max.; acid value of 323 to 329; moisture and unsaponifiable content both 0.2%; and color, Lovibond 5¼", 2R to 20Y max.

### SOLUBILITY AND COMPATIBILITY

Both Neo-Fat 8 and 10 are soluble in the following (Neo-Fat 8 in all proportions): acetone, amyl acetate, benzol, butanol, carbon tetrachloride, dipentene, ethanol 95% and 100%, ethyl ether, ethylene glycol, kerosene, methyl cellosolve, turpentine, V.M.&P. naphtha, and xylol.

Both are compatible (at 60°C.) with the following: asphalt, beeswax, carnauba wax, ester gum, gum resin, linseed oil, paraffin wax, petroleum pale oil and soybean oil.

### NEO-FAT 8 USES

Due to its exceptionally high purity, Neo-

Fat 8 is an excellent raw material for producing derivatives of caprylic acid, such as alcohols, aldehydes, ketones, esters, metallic salts, nitriles, amides, amines, and other such products. The pure acid or its derivatives find use in the manufacture of essences, synthetic perfumes, flavors, artificial leather, among other applications. It is also used in anti-foaming agents, dye-stuffs, pharmaceuticals, and as a manufacturing intermediate in many synthetic organic compounds.

Esters of caprylic acids with diethylene, triethylene and propylene glycols are suitable plasticizers for ethyl and nitrocellulose, polyvinyl acetate, etc. Triethylene glycol dicaprylate is used with other plasticizers in vinyl-vinylidene copolymers to act as an extrusion aid. Neo-Fat 8 may also be used as a high boiling solvent for plastics, varnishes, gums, etc.

### NEO-FAT 10 USES

Neo-Fat 10 is an excellent raw material for producing alcohols, aldehydes, ketones, esters, metallic salts, nitriles, amides, amines and other derivatives of capric acid which find many varied uses in the chemical industry and in many other fields.

In other applications, capric acid finds use in the manufacture of essences, synthetic perfumes, flavors, disinfectants, anti-foaming agents, vinyl chloride polymers, dye-stuffs, pharmaceuticals, high boiling solvents for paints, varnishes, plastics, gums, etc., and as a manufacturing intermediate in many synthetic organic compounds. Send the coupon for samples of these two versatile chemicals.

## LOW COST NEO-FAT PROVIDES QUALITY ALKYD FINISHES

Neo-Fat 280 is a new low cost material for the production of high-bake alkyd finishes. It parallels the performance of Neo-Fat 12, high purity lauric, at much lower cost, and provides many of the same advantages. It offers the same absence of unsaturated fatty acids—less than 1% unsaturated content, maximum. It meets all requirements necessary for tough, flexible finishes of superior quality.

When properly formulated, applied and baked, Neo-Fat 280 provides excellent non-yellowing properties. Urea or melamine

resin-modified alkyds made with it are stable to heat and light. Neo-Fat 280 insures whites that stay white regardless of age or atmospheric conditions.

Specifications for Neo-Fat 280 include a titer of 31 to 36°C.; iodine value of 1 max.; acid value of 275 to 281; unsaponifiable content 0.2% max.; color, Lov. 5¼", 1R/10Y max.; or Gardner, 1933 standards, 1 max.

Neo-Fat 280 is available in 55-gallon drums and in aluminum tank-cars. Send the coupon for a free sample.

Send literature:	Fatty Acids: <input type="checkbox"/> Armour Chemicals for Soaps <input type="checkbox"/> Coco Fatty Acids	Derivatives: <input type="checkbox"/> Chemistry of Fatty Amines
Send samples:	<input type="checkbox"/> Neo-Fat 8 <input type="checkbox"/> Neo-Fat 16 <input type="checkbox"/> Neo-Fat 10 <input type="checkbox"/> Neo-Fat 280	<input type="checkbox"/> Armeen DMS <input type="checkbox"/> Armeen DM 18
Name.....	Title.....	
Firm.....		
Address.....		
City.....	Zone.....	State.....
CP 4		

When inquiring check CP 6113 opposite last page

## Materials—Feature Section

248) 2-HYDROXY-1-NAPHTHALDEHYDE — Intermediate for pharmaceuticals and dyes. MP: 81-82°. BP: 192° @ 27mm. Insol: water. Sol: alcohol, ether.  $C_{10}H_7(OH)CHO$ . Exp. Kay-Fries.

249) 4-HYDROXY-3-NITROBENZENEARSONIC ACID — Reagent for Sn. Dist. Prod.

250) 2-(o-HYDROXYPHENYL) BENZOTHAZOLE — Reagent for Cd and Cu. MP: 131-132°. Distillation Products.

251) HYDROXYPIVALDEHYDE —  $HOCH_2C(CH_3)_2CHO$  assays 90% on dry basis, 50% on wet basis. Eastman Chem. Prod.

252) 1,12-HYDROXYSTEARYL ALCOHOL — Adol 45 has 89% purity. MP: 69°. BP: 315-335°. Sol: ether, benzene. For polyesters, surface-active agents, lubricants. Pilot plant scale. Has molecule flexibility. A-D-M.

253) INTERFACIAL TENSION DEPRESSANT — Atpet 931, a mixture of non-ionic fatty acid esters of polyhydric alcohols, is used in restoring water-blocked oil wells to production. Effective at low concentrations (10-100 gal/well, at concentration of 1% in field crude); does not plate out on solid surfaces. The Atlas Powder Company.

254) IRON-CHELATING AGENT — Versen-OI controls  $Fe^{+++}$  over wide pH range. Should find use in paper, textiles, soaps, other materials involving wet processing where trace Fe causes contamination. Sol: water. Versenes.

255) IRON OXIDE PIGMENTS — Mapco Tan 15 for high gloss, semi-gloss enamels and flat paints. Highly compatible, non-bleeding, light-fast. Brown 422 makes exceptionally rich browns, has shelf-stability. Columbian Carbon.

256) IRRADIATED POLYETHYLENE — Irrathene is polyethylene bombarded with high-energy cathode rays. Cross-linking gives form stability at 300-350°F and crack-resistance under stress and in contact with solvents, active chemicals. Supplied in narrow film form. Use: Insulating tape, packaging film. GE.

257) ISO-DECYL OCTYL PHTHALATE — As a plasticizer for vinyls and other resins, Dinopol IDO is esp. good at high and low temp with polyvinyls. Superior to DOP in migration. BP: 242°C. Ohio-Apex of FMC.

258) ISO OCTYL DECYL PHTHALATE — Plasticizer PX-118 for vinyl products. Low volatility, high permanence. Pittsburgh Coke.

259) ISO OCTYL/ISO DECYL PHTHALATE — Blend imparts good low-temp, low-volatility characteristics to vinyl plastics. Dewey & Almy.

260) ISOCYANATE RESINS — Foamed-in-place resins for thermal insulation, potting electrical units. Urefoam R is rigid; F, flexible. "K" values of 0.25-0.30 are obtained. Good electrical properties. Atlas Mineral Products Company.

261) L-ISOLEUCINE — Optically standardized for biochemical, nutritional research.  $C_6H_{13}O_2N$  is alloseucine-free. Schwarz Labs.

262) ISOPHTHALIC ACID — Oronite Isophthalic,  $C_6H_4(COOH)_2$ , as a bi-functional aromatic intermediate. Introduced in sample and pilot quantities during 1954, it will be produced commercially during the latter part of 1955. Produces faster drying, harder tougher films, and longer oil lengths in alkyd resins, modified oils. It is a plasticizer of low volatility. Increases toughness and strength of polyamides. With polyesters, it increases flex and impact strengths, heat distortion points. Purity: 99+%. MP: 354°C. Bodily contact should be avoided. Oronite Chemical.

(Continued on next page)



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Company \_\_\_\_\_

When inquiring check CP 6114 opposite last page

## new chemical materials

Nos. 263 to 300

(Continued from preceding page)

263) **ISOPROPYLAMINOETHANOLS** — IPIE is blend of the mono- and diethanolamines. BP: 110-265°. An emulsifier intermediate for water emulsion polishes and cleaners, cosmetic and pharmaceutical emulsions, leather dressings, emulsion paints, lithographic inks, household detergents, textile chemicals. Mild odor, high flash point, low toxicity. Sharples Chem.

264) **ISOPROPYL ETHER** — For lab studies of manufacturing processes involving isopropyl ether. Reagent-grade. Water content <0.05%. [(CH<sub>3</sub>)<sub>2</sub>CH]<sub>2</sub>O boils at 67-69°. Exp. Fisher.

265) **p-ISOPROPYL PHENYLACETIC ACID** — C<sub>11</sub>H<sub>14</sub>O<sub>3</sub> is intermediate for pharmaceuticals, other products. Pure, white, crystalline powder. MP: 48-50°. Min purity: 99°. Toxicity: nil. Exp. Verona Chem. Co.

266) **KARL FISCHER REAGENT** — Stabilized, single solution reagent with long shelf life used to measure moisture in organic liquids. Exp. Fischer.

267) **LANOLIN** — Fluilan Liquid Lanolin is derived wholly from Lanolin Anh, USP. Sol: mineral oil in all strengths. Gives clear solutions. Use: In manufacture of hair lacquers, brilliantines. Toxicity is nil. MP: 18°C. Croda Inc.

268) **LANOSTEROL** — 100% pure, Lanster Brand Lanosterol. Used by television, telephone, and allied electrical industries in transformers, where its high dielectric constant (12 compared to 6 for conventional waxes) is of value. MP: 141°C. Croda.

269) **LAUROYL CHLORIDE** — C<sub>12</sub>H<sub>25</sub>OCl. 98% min. BP: 105° @ 3 mm. Synthesis of lauric esters and amides. Water-white liquid. Trubek Labs.

270) **LEADED ZINC OXIDE** — Ozlo 18M. Cofumed. Assays 82% ZnO, 18% PbO • PbSO<sub>4</sub>. Very efficient white pigment for exterior paints. Sherwin-Williams.

271) **D-LEUCINE** — Optically standardized for biochemical, nutritional research. C<sub>6</sub>H<sub>13</sub>O<sub>2</sub>N. Schwarz Labs.

272) **LIGNIN/GR-S COPRECIPITATE** — Indulin-70-GR-S is coprecipitated lignin and GR-S-1500 in ratio of 70 lb lignin per 100 lb GR-S. Used in mechanical rubber goods, it imparts high hardness, high elongation, low modulus, low sp gr, color possibilities. West Va. Pulp & Paper.

273) **LOW VISCOSITY RESINS** — Pliolite S-5C and S-5D have low viscosity. S-5C has range of 130-160 seconds; S-5D, 100-130 seconds. Offer considerable latitude in formulating. Possibility of adjusting solids content helps spray applications, one-coat maintenance coatings, printing inks. Goodyear Chem.

274) **LUBE OIL ADDITIVES** — Use: as detergent-dispersants and VI-improvers in lube oils. Additives 564 and 565 are ashless, usually effective dispersants under low-duty operating conditions. DuPont.

275) **MALEIC ANHYDRIDE** — Makes alkyl and polyester resins, esters, modified and upgraded drying oils, rosin sizes, surface-active agents, plasticizers, rubber chemicals, agricultural chemicals, textile sizes, pharmaceuticals, vinyl resin stabilizers. Sp gr (60°/20°): 1.305. American Cyanamid.



276) **MALEIC ANHYDRIDE** — Purity of 99.7% C<sub>4</sub>H<sub>2</sub>O<sub>3</sub>. BP: 200°. Solidifies: 52.8°. Excellent color. Intermediate for plastics, adhesives, surface coatings, pharmaceuticals, fine chemicals, surface-active agents, food products, drying oils, plasticizers, water disinfectants, insecticides, plant control agents, lube oil additives, soil conditioners, insect repellents. National Aniline.

277) **MALONONITRILE** — Intermediate: pharmaceuticals, dyes. CH<sub>2</sub>(CN)<sub>2</sub>. Melts: 32°. Boils: 223-224, with decomposition if distilled in large quantity at atmospheric pressure. Exp. Kay-Fries.

278) **MANGANESE CARBONATE** — Uniformly fine powder of uniform particle size. Metallic impurities: 0.3%. For animal feeds, cosmetics, fertilizers, pigments, paint driers, rust proofing compounds, dry cell batteries, ceramics, electrolytic feeds, alloys, all Mn compounds. Manganese Chem. Corp.

279) **MANGANESE DIOXIDE** — 60% Mn, 10% lower oxides, 5% H<sub>2</sub>O and carbonates. Fine powder. Oxidizing agent. Used in ceramics, ferrites, alloys, permanganates, dry cell batteries. Manganese Chem.

280) **MANGANESE SULFIDE** — Glass colorant for use as direct or partial replacement for FeS sources in conventional amber glass. Amber color is free from muddiness. Particle size: <20 mesh, with 70-75% passing through 140 mesh. Foote Min.

281) **MANGANOUS FLUOSILICATE** — MnSiF<sub>6</sub> • 6H<sub>2</sub>O. Tech and CP. Sol: water. Exp. City Chem. Corp.

282) **2-MERCAPTOBENZOXAZOLE** — C<sub>6</sub>H<sub>5</sub> • N • C • (SH)O. Light tan crystals melting at 183-187°. Intermediate. Exp. Sol: ether, alcohol, hot water. Monsanto.

283) **METHACROLEIN DIMER** — C<sub>8</sub>H<sub>12</sub>O<sub>2</sub>. Intermediate. BP: 170°. Exp. Union Carbide.

284) **METHOXYACETIC ACID** — CH<sub>3</sub>OCH<sub>2</sub>COOH. Melts at 7.7°. A chemical intermediate. Dow Chem.

285) **p-METHOXYPHENYLACETIC ACID** — A pharmaceutical and dye intermediate with formula C<sub>9</sub>H<sub>9</sub>(OCH<sub>3</sub>)CH<sub>2</sub>COOH, purity of 99.5% min. Melts at 185-186°C. Sol: boiling water, alcohol, ether. Exp. Kay-Fries.

286) **METHYL ACETATE** — CH<sub>3</sub>COOCH<sub>3</sub> reagent grade. Solvent for many resins and oils, and in making cellulose nitrate and artificial leather. BP: 57-59°. Non-volatile: 0.002% min. Lab quantities. Fisher.

287) **METHYL ACETATE** — Methyl Solvent is 60% methyl acetate, 40% methanol. BP: 55-65°C. Toxicity: same as methanol. Uses: nitrocellulose lacquers, cleaners, thinners, varnishes, paint removers. American Monomer Corp.

288) **METHYL ALKYL KETONES** — The methyl heptyl, nonyl, undecyl, pentadecyl, heptadecyl ketones are approx. 98% pure. For chemical syntheses to make polymers, oil additives, surface-active agents, lubricants, essences. Also alone as ingredients for rubber, solvent applications, plasticizers. Exp. Armour Res.

289) **METHYL ESTERS OF COCONUT FATTY ACID** — Eldo Methyl 55, CP grade, melts at -4°. Economical source of coconut fatty acid radical for soaps, cosmetics, textile chemicals, alcohols. Non-corrosive. El Dorado.



290) **METHYL ISOAMYL KETONE** — Solvent in nitrocellulose lacquers and vinyl coatings.  $(CH_3)_2C_6H_4COCH_3$  boils at 145.4°. Sol: acetone, benzene, ethyl ether, heptane, methanol,  $CCl_4$ . Sl. sol: water. Exp. Union Carbide.

291) **METHYL MERCAPTAN** — An odorant, for methionine synthesis, and for making insecticides and organic compounds where methyl thio-ether linkage is desired. Low cost, of 98% mol % purity. BP: 7.6°. Highly toxic. Sl. sol: water. Sol: alcohol. Pan American Chemical Company.

292) **METHYL NADIC ANHYDRIDE** —  $\alpha$ -Methyl *cis*-endo-bicyclo (2.2.1) hept-5-ene-2,3-dicarboxylic anhydride,  $C_{10}H_{16}O_5$ ; purity of 97% min. Sl. sol: petroleum ether. Sol: common organics. For plastics, insecticides. Exp. National Aniline.

293) **METHYL PHENYL SILICONE FLUID** — 555 Fluid is non-toxic, non-irritating, alcohol-soluble. Functional base for cosmetic preparations, dermatological protectants. Very compatible. Dow Corning.

294) **METHYL *n*-PROPYL KETONE** — 95% min  $CH_3COCH_2CH_2CH_3$ . Lacquer, resin solvent; dewaxing solvent for lube oils. Intermediate for pharmaceuticals. BP: 101.4-103.1°. Sl. sol: water. Sol: ethanol. Union Carbide.

295) **METHYL TETRAHYDROPHTHALIC ANHYDRIDE** — 99.0%  $C_{10}H_{10}O_5$ . Makes plasticizers, alkyd resins. Alkyd resin varnishes have superior hardness, color properties. Solidifies: 61.6°. Exp. National Aniline.

296) **2-METHYL 2-THIOPSEUDOUREA SULFATE** —  $(C_2H_4N_2S)_2 \cdot H_2SO_4$ . Pure grade. Dec: 235-236° City Chem. Corp.

297) **9-METHYL-2, 3, 7-TRIHYDROXY-6-FLUORONE** — Sb reagent. Eastern Chem.

298) **METHYLCYCLOHEXYLMETHYL AMINE** — Mixed isomers of  $C_8H_{17}NH_2$ , called Cyclamine 8. Used to prepare oil demulsifiers, corrosion inhibitors, surface-active agents, oil additives, rubber chemicals. BP: 185.6°, sets to glass below -90°. Sl. sol: water. Exp. Union Carbide.

299) **METHYLENEDIPHENYL-4, 4'-DIISOCYANATE** — Intermediate for elastomers, foams, adhesives, fibers, other polymers. Formula:  $OCN(C_6H_4)CH_2(C_6H_4)NCO$ . Solidifies: 37.2°. Purity: 99.4% min. Exp. National Aniline.

300) **MIXED DIALKYLAMINES** — Armeens 2S and 2T have general formula  $RNHR$ . Tech. Secondary amine content: 85%. Primary amine content: 5%. Insol: water. Sol: most organics, above 50°. Uses: corrosion inhibitors, lube additives, in rubber processing, for textile treating compounds, and as emulsifiers and demulsifiers. Armour and Company.

(Continued on next page)

UNLESS OTHERWISE SPECIFIED . . .

- 1) Commercial quantities are available ("Exp." indicates otherwise)
- 2) Pressures are in mm of mercury (abs.)
- 3) Boiling points are at 760 mm
- 4) Temp is in °C
- 5) Solubilities are at "room temp"

# pigment binding power

## What do you want in vinyl emulsions?

## tough flexible films

### RESYN® 12K-51 OFFERS BOTH . . . plus water resistance.

An inherently flexible vinyl copolymer emulsion, Resyn 12K-51 deposits strong, tough, water-resistant films with very high pigment binding power. Further plasticizing is generally unnecessary.

#### PROPERTIES:

**Tensile** on free films, 2,200 psi. Elongation 300%.

**Flexibility** equivalent to about 10% plasticizer on ordinary polyvinyl acetate solids. Flexibility permanent—no migration or evaporation:

**Binding Power** significantly higher than ordinary polyvinyl acetate, permitting higher pigment:resin ratios with improved physical properties. Write for reprint of article on critical pigment volume concentration studies published in October 7 issue of "Paint, Oil and Chemical Review."

**Water Resistance** far superior. For example, on standard scrub test Resyn 12K-51 films withstand about 500 wet rubs, while ordinary polyvinyl acetate emulsion films fail in less than 50 wet rubs.

#### DATA:

solids—55%  
pH—4-5  
particle size—mostly under one micron  
viscosity—about 2,000 cp



**YES**—We are interested in vinyl emulsions with superior properties. Please send technical data and information on their use for:

RESIN DIVISION, National Starch Products Inc.  
270 Madison Avenue, New York 16, N. Y.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check CP 6115 opposite last page

Dept. 3

# 3 important members



## of the QO chemical family

### QO furfural,

an aldehyde, is an amber colored liquid; it is useful as a chemical intermediate in making open chain compounds, as a selective solvent in purifying mixtures such as lubricating oils and other petroleum fractions, as a resin forming agent in making molding powder and industrial resins, as well as a solvent, wetting agent, and pesticide.

### QO (FA) furfuryl alcohol,

an amber liquid, is an excellent solvent for nitrocellulose, dyes and a number of synthetic and natural resins. Its largest use is based on its ready resinification when catalyzed by acidic reagents to form resins which are resistant to attack by acids, alkalis, and solvents.

### QO (THFA) tetrahydrofurfuryl alcohol,

a water-white to pale yellow mobile liquid, is a high boiling primary alcohol. THFA is used as a chemical intermediate in making dihydropyran, agricultural chemicals, and plasticizers. It is also useful as a solvent and wetting agent.

Write for our Bulletin 201A, General Information about QO Chemicals

\*Reg. U. S. Pat. Off.

The Quaker Oats Company

CHEMICALS DEPT.

336A The Merchandise Mart, Chicago 54, Illinois  
Room 536A, 120 Wall St., New York 5, N. Y.  
Room 436A, P. O. Box 4376, Portland 8, Oregon

In Europe: Quaker Oats-Graanproducten N. V.,  
Rotterdam, The Netherlands;  
Quaker Oats (France) S. A., 3, Rue Fillet-Will, Paris IX, France  
In Australia: Swift & Company, Pty., Ltd., Sydney  
In Japan: F. Kanematsu & Co., Ltd., Tokyo

When inquiring check CP 6116 opposite last page

## Materials-Feature Section

### new chemicals — 301 to 328

(Continued from preceding page)

301) MODIFIED ALKYL ARYL SULFONATE — Nacconol 60 S. General wetting agent and detergent as intermediate or base for hair shampoos, industrial and household cleaners. Faint pleasant odor, light color, excellent foaming, wetting, detergent properties. Haze point of 32°F or below. 60% min solids. National Aniline.

302) MOLYBDENUM DISULFIDE — Molykote is 99% MoS<sub>2</sub>. Has temp range of -300°F to +1000°F for high temp, high pressure lubricants. Prevents metal-to-metal contact beyond 400,000 psi. Alpha Corp.

303) MOLYBDENUM DISULFIDE DISPERSION — Dag Dispersion No. 223 is colloidal MoS<sub>2</sub> in epoxy resin soln. Durable, corrosion-resistant. Use: Dry-film lubricant. Acheson Colloids Co.

304) MOLYBDIC OXIDE — Raw material for chemical syntheses. For Mo catalysts, ceramics, agricultural mineral supplement. 90% HoO<sub>3</sub>. Climax Molybdenum.

305) MYO-INOSOTOL — White, crystalline powder reported as minor nutritional factor, lipotropic agent for pharmaceuticals. (HCOH)<sub>6</sub>. Corn Prod. Sales.

306) MYRISTYL ALCOHOL — White, solid alcohol of high purity. Formula: CH<sub>2</sub>(CH<sub>2</sub>)<sub>12</sub>CH<sub>2</sub>OH. MP: 36° min. At 760 mm, 95% boils between 285-292°. Applied to skin, it has emollient properties, leaving skin velvety, pliant. Uses: ingredient of cold creams, face creams, lipsticks; as a base for suppositories, medicated creams. Quaternaries containing myristyl radical are germicides. Aceto Chem. Co.

307) NADIC ANHYDRIDE — *cis*-endo-Bicyclo (2.2.1) hept-5-ene-2,3-dicarboxylic anhydride has min purity of 99.5%. Melts at 164.0° min. Sl. sol: petroleum ether. Sol: common organics. Direct uses: control of vulcanization in rubber, curing catalyst for acid-curing, thermosetting resins. End uses: various esters as copolymers for plastics, as plasticizers, insecticides. Esters sulfonated to surface-active agents. Amides and imides are insecticides. C<sub>6</sub>H<sub>4</sub>O<sub>3</sub>. National Aniline.

308) NEMACIDE — Called V-C 13 Nemacide, material is an 80% emulsifiable concentrate forming stable emulsions in water. LD<sub>50</sub>: 160-200 mg/kg, single oral dose on rats. High nematocidal activity, low phytotoxicity. Virginia-Carolina.

309) NEOMYCIN SULFATE — Antibiotic is active against gram positive and gram negative pathogens. C. Pfizer.

310) 3-NITRO BENZALDEHYDE — 97% pure C<sub>7</sub>H<sub>5</sub>NO<sub>2</sub>. Makes organics, esp. pharmaceuticals. MP: 56°. Sol: most organics. National Aniline.

311) *p*-NITROBENZENEDIAZOAMINOAZOBENZENE — Cd, Mg, Hg, Bi reagent. Eastern Chem.

312) *o*-NITROBENZENESULFENYL CHLORIDE — NO<sub>2</sub>C<sub>6</sub>H<sub>4</sub>SO<sub>2</sub>Cl reacts similar to acid chlorides. Use: Organic syntheses. MP: 73-74°. Sol: benzene, acetic acid, chloroform. Sl. sol: ether, CCl<sub>4</sub>. Exp. Monsanto.

313) NITROGEN SOLUTIONS — A source of NH<sub>4</sub>NO<sub>3</sub> and NH<sub>3</sub> for making fertilizers. Three solns. Differ in NH<sub>4</sub>NO<sub>3</sub>/NH<sub>3</sub> ratio, all have about 40% total nitrogen. Commercial Solv.

314) NITROPARAFFINS — Nitromethane, Nitroethane, 1-nitropropane, 2-nitropropane are chemical intermediates; specialized solvents for many coating materials, resins, gums, dyes, waxes, other organics; selective extractants for aromatics. Purities from 90-95%. Commercial Solv.

## If you manufacture a product requiring a high quality WAX

You should get all the facts on

# PETROLITE

MICROCRYSTALLINE AND SYNTHETIC

# WAXES



Petrolite waxes are the products of a refinery devoted exclusively to the production of fine waxes. They are highly refined end-products, not by-products.

### TABLE OF SPECIFICATIONS MICROCRYSTALLINE

Crown Wax	M.P. °F.	Penetration	Color—NPA	Acid No.	Sap. No.
15	180 Min.	4 to 6	4-5	14-16	50-60
23	180 Min.	4 to 6	4-5	20-25	55-65
36	180 Min.	5 to 7	5-6	30-35	75-85
50	180 Min.	3 to 5	dark	10-20	65-75
180	180 Min.	15 Max.	2-2½	Nil	Nil
200	190 Min.	8 Max.	brown	Nil	Nil
500	190 Min.	8 Max.	2-2½	Nil	Nil
*700	190 Min.	4 Max.	2-2½	Nil	Nil
*1035	195 Min.	2 Max.	2-2½	Nil	Nil
Jet Black	185 Min.	11 to 16	black	Nil	Nil

\*Available in powdered form (16 mesh max.)

### SYNTHETIC AND SPECIAL WAX

Product	M.P. °F.	Penetration	Color—NPA	Acid No.	Sap. No.
*P-20	210-220	2 Max.	3 Max.		
*P-25	210-220	2 Max.	3 Max.		
PE-100	195-200	2-3	4-6	15-20	45-55
R-50	190-200	2 Max.	4½ Max.	40-50	65-80
PC-13	185-195	6 to 8			

\*Available in powdered form (16 mesh max.)

Petrolite waxes are designed to extend or completely replace costly vegetable waxes. Many alert manufacturers are gaining substantial economies by so using them. Why not get all the facts? Prices, samples and technical information are yours for the asking.

# PETROLITE

## CORPORATION

### WAX DIVISION

Chrysler Bldg., New York 17, N. Y.  
P. O. Box 390, Kilgore, Texas

Petrolite Waxes are available for shipment from Jersey City, Chicago, Los Angeles, or Kilgore. P355-F

When inquiring check CP 6117 opposite last page

CHEMICAL PROCESSING



315) **NONIONIC SURFACE-ACTIVE AGENT** — Surfynol 102 is a non-foaming, nonionic surface-active agent; pigment dispersant in emulsion paints. General formula:  $(R_1R_2(OH)C_2)_2$ . Sl. sol: water. Sol: ketones, chlorinated solvents. BP: 253°. MP: 51-53°. Purity: 95%. Air Reduction Chem.

316) **NONIONIC SURFACE-ACTIVE AGENT** — Tergitol Nonionic NP-40, an alky aryl polyethylene glycol ether. Sol: boiling water, with electrolytes. Uses: detergent and dispersant in high-temp scouring and cleaning, and as leveling agent for dispersed dyes. Union Carbide.

317) **NONIONIC SURFACE-ACTIVE AGENT** — Surfynol 104 has general formula:  $(R_1R_2(OH)C_2)_2$ . It is a non-foaming, nonionic surface-active agent used in low-foam detergents. Also reduces viscosity, controls gelation of aq. gum systems, vinyl plastisols. Purity: 95%. BP: 260°. MP: 37-38°. Sol: most organics. Air Reduction Chem.

318) **NONIONIC SYNTHETIC RESIN** — Chem Resin G is stable, compatible in acid, alkaline mediums. Sol: water, oxygen-containing organics. Dries to clear film having superior properties. For protective coatings, paper, metal textile processing. Chem. Products.

319) **allo-OCIMENE** — Approx. 80%  $C_{10}H_{16}$ . Chemical intermediate, modifying agent in unsaturated systems. Polymerizes readily and has three double bonds. Glidden-Naval Stores Div.

320) **OCTENES** — Of 98 mol % purity, octenes should find use in making a liquid octyl phenol, an intermediate for nonionic detergents and other products. Octenes undergo oxidation, halogenation, alkylation, oxo-synthesis. Exp. Boils: 225-250°F. Sinclair Chemicals.

321) **OIL BASE-STOCK FOR COATINGS** — C-Oil, a heavy-bodied, sticky, almost colorless liquid petrochemical based on butadiene. As an oil-base stock for varnishes, masonry paints, surface coatings, metal primers. Imparts scratch-, chemical-resistance. Exp. Glidden.

322) **OLEIC ACID** — No. 905 has excellent color-clarity, stability. Titer: 5 max. FFA (as oleic): 98-102. Lovibond (5 1/4" col.): 10Y/1.0 R max. Swift-Ind. Oils.

323) **OLEIC ACID SULFONATE** — Sul-Fon-Ate OA-5, a true sulfonate of oleic acid, is surface-active agent in acid wet processing. Stable, high aq. solubility, even at low pH's. Low foaming. Tennessee Corp.

324) **ORGANIC AMINO COMPOUND** — As a permanent gas fading inhibitor for dyes acetate fabrics, Dextrol Antifume A-15 retains its effectiveness after repeated washings, dry cleanings. Dexter Chem.

325) **ORGANIC PHOSPHATE** — Antistatic Agent 27. Nonionic. For synthetic fibers. Emulsifies in water. Slowly sol. in red oil. MP: approx. 55°. Victor Chem. Works.

326) **ORGANIC PHOSPHATE SALT** — Catalyst 740 for curing acid-setting resins. Imparts no color to polymerized resin. Neutral at room temp, pH decreases on heating. Sol: water. Exp. Victor Chem. Works.

327) **ORGANIC PHOSPHATE SALT** — Victablend is used as blending agent for certain synthetic detergents in strong electrolyte solns. Recommended for built liquid detergents, as wetting agent in electrolyte solns where most organics are salted out. Sol: water. Insol: acids, hydrocarbons. Victor Chem. Works.

328) **ORGANIC PHOSPHATE SALT** — Victawet CP has rapid wetting properties, excellent water-solubility. Compatible with high concentrations of electrolyte. Low to moderate foamer. Insol: acids, hydrocarbons. No industrial hazards. No sharp MP. Victor Chem. Works.

(Continued on next page)

Sodium  
Polyphos

SODIUM HEXAMETAPHOSPHATE  
SODIUM TETRAPHSOPHATE

Trisodium  
Phosphate  
Chlorinated

Tetrasodium  
Pyro  
Phosphate

Trisodium  
Phosphate  
CRYSTALLINE  
MONOHYDRATE

# Sodium

Sodium  
Tripoly  
Phosphate



BLOCKSON  
CHEMICAL  
COMPANY  
JOLIET, ILLINOIS

# Phosphates

Disodium  
Phosphate

ANHYDROUS  
CRYSTALLINE

Monosodium  
Phosphate

ANHYDROUS  
MONOHYDRATE

Sodium Acid  
Pyro  
Phosphate

also major  
producers of:  
SODIUM  
SILICOFLUORIDE  
SODIUM FLUORIDE  
HYGRADE  
FERTILIZER

When inquiring check CP 6118 opposite last page



## TWO Hydrogenated Tallow Fatty Acids

MADE FOR TWO  
REASONS:  
**Whiteness  
AND  
Stability**



Searching for fatty acids that resist rancidity and impart extra whiteness to your product? Then you will want to know more about HYDROFOL 410 and 420. Check these specifications:

HYDROFOL 410		HYDROFOL 420
201-206	Acid No.	204-209
202-207	Saponification Value	205-210
1.0 Max.	Iodine Value	1.0 Max.
58.5-61	Titre °C	54-56
10Y/IR	Color (5 1/4" Lovibond)	10Y/IR

These acids contain less than 1% unsaturated fatty acids. They are extremely white in color and resist darkening even at elevated temperatures. The low iodine number of both HYDROFOLS makes them practically resistant to oxidation or rancidity. HYDROFOL ACIDS 420 contains a ratio of palmitic to stearic that approaches the trade concept of stearic acid.

### WRITE FOR YOUR COPY OF THE NEW ADM CATALOG

Contains complete technical information on all standard ADM Chemifats.



ACIDS • GLYCERIDES • SPERM OILS • ALCOHOLS

FROM VEGETABLE • ANIMAL • MARINE OILS and FATS

#### Other ADM Products:

Linseed Oil, Soybean Oil, Fish Oil, Paint Vehicles, Vinyl Plasticizers, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa Meal, Livestock and Poultry Feeds

PRODUCED IN  
ANY QUANTITY

SAMPLES TO  
SHIPLOADS



ARCHER • DANIELS • MIDLAND COMPANY

Chemical Products Division • 2191 West 110th St. • Cleveland 2, Ohio

When inquiring check CP 6119 opposite last page

## Materials—Feature Section

### new chemicals — 329 to 338

(Continued from preceding page)

329) **ORGANIC PHOSPHATE SALT** — Victawet EHP is anionic surface-active agent, non-foaming. Sol: water. White, powdered, it is effective where faster-than-ordinary wetting is required. No industrial hazards presented with use. Victor Chem. Works.

330) **ORGANO-ALUMINUM SILICATE** — Stable organic compound of montmorillonite, a hydrous aluminum silicate mineral having an expanding lattice, Bentone 18-C imparts predictable thixotropic bodying action, good pigment suspension, and control of penetration to organic solvents of high polarity. National Lead.

331) **ORGANO-BARIUM STABILIZERS** — One-package liquid Ba-Cd stabilizer for plastisols, organosols, Advastab BC-105 gives heat, light stability to most vinyls. Effective in rigid. BC-16 is a liquid organo-Ba stabilizer with no sulfur staining. Advance Solvents.

332) **ORGANO-PHOSPHORUS COMPOUND** — Anti-static Agent PCO for synthetic fibers. Good emulsifier, is nonionic, has high viscosity. Tech. Dec. on heating. Victor Chem. Works.

333) **ORGANO-TIN STABILIZERS** — Stabilizer P-1835, an organo-tin compound, has low toxicity, gives high clarity to vinyls. T-72, also an organo-tin stabilizer of low toxicity, gives min odor and irritating fumes in processing. Advance Solvents.

334) **OVERPRINT VARNISH** — C 602. A soln coating for depositing tough, flexible, abrasion-resistant films on printed polyethylene surfaces by converters and printers. Dries at room temp. American Resinous Chem.

335)  $\beta$ ,  $\beta'$ -**OXYDIPROPIONITRILE** —  $(NCCH_2CH_2)_2O$ . Selective solvent for countercurrent extraction of aromatics from aliphatics; chemical intermediate. Exp. BP: 140° @ 3 mm. Monsanto.

336) **PALCONATE** — Na salt of sulfonated complex organic acids whose structure is not definitely known. Palconate is soluble in water, insol in alcohol, hexane, or ether. A dispersing agent, ceramic binder, battery expander, ore flotation, and phenol replacement. Ratio of aliphatic: carboxylic: phenolic hydroxyls is 2:3:4. Pacific Lumber Co.

337) **PALCOTAN** — Uses: Dispersing agent, tannin replacement, drilling mud conditioner, water treatment, ore flotation, leather tanning. Na salt of sulfonated complex organic acids of unknown structure. Sol: water. Insol: alcohol, ether. Pacific Lumber Co.

338) **PENTAERYTHRITOL** — 84-88%  $C(CH_2OH)_4$ . MP. 175-230°. For alkyd resins; gives rapid bodying, fast dry, good gloss, gloss retention, hardness, alkali-, water-, weather-resistance to paints, enamels, undercoats. Non-toxic. Insol: benzene, acetone, fats and oils. Sl. sol: water, ethanol, glycerol, pyridine. Sol: boiling water. Reichhold Chem.

(Continued on page 60)

Use-index for all these products starts on page 80. See it first if you're after a chemical material for a specific use. It's cross-indexed with this list. Manufacturer address list starts on page 82. Use it when writing for more information on materials which interest you.

Latest Product  
Development of  
**ZONOLITE COMPANY**

## The **BIG NEWS** in Carriers is **VERMICULITE**

### New Use for This **WONDER MINERAL**

— amazing lightweight vehicle  
that turns liquid chemicals  
into free-flowing solids

Zonolite's new carrier for chemicals is typical of the growing trend to the use of *vermiculite* by industry. It is fast gaining recognition because of these remarkable properties:

#### ★ **ABSORBENT... FREE FLOWING**

Zonolite's new carrier remains free flowing even when mixed with a high percentage of chemicals. Lightweight, amazingly absorbent.

#### ★ **OVER 27,500,000 PARTICLES per lb.... (28/65 mesh)**

Offers greater dispersal of chemicals. Its granular structure makes chemicals available for longer, more effective use.

#### ★ **READILY AVAILABLE FROM OVER 40 PLANTS**

Quick service is assured.  
Shipping costs lowered.

### **ZONOLITE COMPANY**

Zonolite Company, Dept. CP-45  
135 S. LaSalle St.,  
Chicago 3, Illinois

#### **FREE SAMPLE!**

Please rush me free working sample and descriptive literature about Zonolite's new free-flowing carrier.

Name.....

Address.....

City.....Zone.....State.....

When inquiring check CP 6120  
opposite last page

CHEMICAL PROCESSING

High ex  
chem p  
found i

Uses:  
in rubber  
as a susp  
ening a  
parent  
agent fo  
slip ager  
caking a  
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Godfrey I  
77 Frankl  
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## Materials

**High external surface,  
chem purity, fineness  
found in silica**

**Uses:** As a reinforcing agent in rubber formulations; in paints as a suspending, flattening, and thickening agent and as a transparent extender; a thixotropic agent for polyester resins; anti-slip agent in floor waxes; anti-caking agent for DDT.

**Features:** High chemical purity, low water content, extreme fineness, high external surface



Electron micrograph shows silica's fineness

area, unusual optical properties. In addition, it is easy to disperse and has no internal surface area.

**Description:** Cab-o-sil, a white 99.0-99.7% pure siliceous pigment is prepared in a hot gaseous environment (1100°C) by vapor phase hydrolysis of a silicon compound.

**Chemical, physical properties:**

Surface area (sq M/gm, N <sub>2</sub> absorption)	175-200
Sp gr	2.1
Refractive index	1.55
pH (10% aq. dispersion)	4.5-6.0
Oil absorption (lb oil/100 lb pigment, Gardner)	150
Bulking value (gal/lb)	0.057

Compressed grade is recommended for rubber applications, uncompressed for paints and plastics.

(Colloidal silica is a product of Godfrey L. Cabot, Inc., Dept. CP, 77 Franklin St., Boston 10, Mass. Check CP 6121, opp. last page.)

For more information on product at right, specify CP 6122  
... see information request blank opposite last page.



Here's another  
new lubrication  
improvement  
from Standard Oil

# WHITE NEW STANOLITH GREASE

A new grease! White and clean in appearance,  
STANOLITH Grease White is the perfect  
grease for use in food and beverage plants.

Specially recommended for bakeries, breweries, candy factories, canning and cereal plants, chemical processing plants, dairies, distilleries, meat processors — all industries where clean, sanitary operating conditions are at a premium.

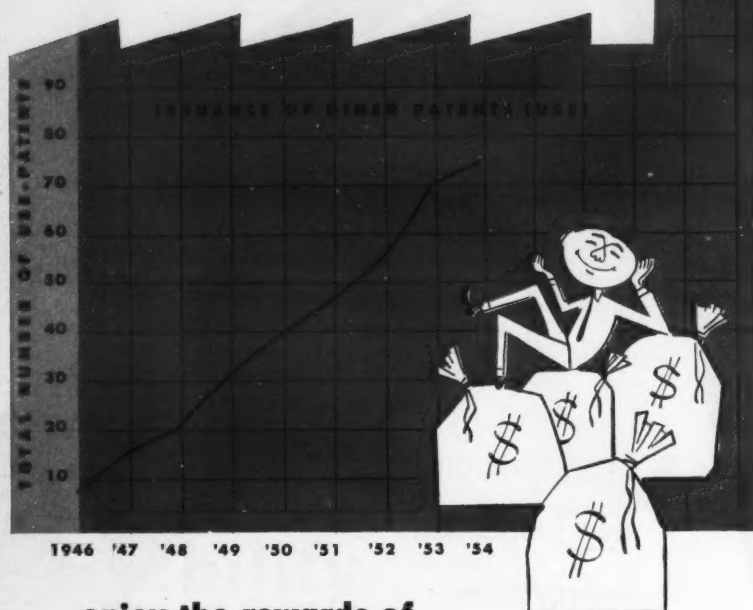
● STANOLITH Grease White is a new high quality, multi-purpose lithium soap grease with a clean, white color. It assures you of unmatched lubricating cleanliness plus unmatched lubricating efficiency.

In addition to the high-temperature and water resistant properties, characteristic of most lithium greases, STANOLITH Grease White has superior mechanical and chemical stability. It provides a water-resistant lubricating film that gives this remarkable grease extended multi-purpose usage in a wide variety of applications. Easily handled in all usual types of grease-dispensing equipment, it is safe, easy-to-use, clean. Call your nearby Standard Oil lubrication specialist for full details on new STANOLITH Grease White.

**STANDARD OIL COMPANY (Indiana)**



every year more use-patents  
are issued to U.S. companies based on  
**EMPOL 1022 POLYMERIZED FATTY ACID**



enjoy the rewards of  
this unique **DIBASIC ACID**—  
investigate it today!

There is no more dramatic proof of the versatility of this unsaturated, high molecular weight, dibasic acid than the number of use-patents which have been issued to U. S. companies. These aggressive firms, in the last seven years, have exploited Empol 1022 with profitable vigor. The result has been a host of new uses for polyesters, polyamides, esters, amides, soaps, and other derivatives in such fields as adhesives, coatings, petroleum, surfactants, resins, and rubbers.

But, the discovery of all these uses for Empol 1022 Polymerized Fatty Acid has by no means exhausted the possibilities. Its unique combination of high viscosity, excellent heat stability, dibasic structure, and relatively high molecular weight ( $C_{20}$ ) still offers unlimited opportunities to alert research organizations. Why don't you investigate Empol 1022 and see how it can be transformed into profitable end-products?



**Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio**  
New York • Philadelphia • Lowell, Mass. • Chicago • San Francisco • Cleveland  
Warehouse stocks also in St. Louis, Buffalo, Baltimore and Los Angeles  
Exports: 5035 RCA Bldg., New York 20, New York

When inquiring check CP 6123 opposite last page

Emery Industries, Inc., Dept. CP 4  
Carew Tower, Cincinnati 2, Ohio

Please send me the following:

☐ Technical information on Empol 1022

☐ Literature and patent bibliography

Name..... Title.....

Company.....

Address.....

City..... State.....

## Materials—Feature Section

### new chemicals — 339 to 353

(Continued from page 58)

**339) 1,5-PENTANEDIOL** — Uses: preparation of polyester resins and plasticizers, and as intermediate.  $HO-(CH_2)_4-OH$ . BP: 242.5°. Freezes:  $-15.6^\circ$ . Sol: water, acetone, methanol. Insol:  $CCl_4$ . Exp. Union Carbide.

**340) PENTATRIACONTENYLSUCCINIC ACID** —  $(C_{16}H_{33})_2C_2H_2(C_4H_7O_4)$ . 95%. Water repellent, corrosion inhib. Exp. Armour Res.

**341) PENTATRIACONTENYLSUCCINIC ANHYDRIDE** — 95% pure. Water repellent, corrosion inhibitor. Exp. Armour Res.

**342) PESTICIDE EMULSIFIER** — An alkyl aryl sulfonate blended with polyoxyethylene sorbitol fatty acid esters, Atlox 3396 is used as pesticide emulsifying assistant. Blends with non-ionic emulsifiers to make easily dispersible pesticide concentrates. Atlas Powder.

**343) PESTICIDE EMULSIFIER** — Atlox 3335, an alkyl aryl sulfonate blended with polyoxyethylene sorbitan esters of mixed fatty, rosin acids, is general purpose pesticide emulsifier. Effective at low concentrations with many toxicants. Concentrates have excellent shelf life. Atlas Powder.

**344) PESTICIDE EMULSIFIER** — Emcol H-83A, a blend of poly ethoxy ethers, esters, and sulfonated oils, is an emulsifier for DDT, chlordane, toxaphene, Malathion, and certain herbicides. Effective in hard or soft waters. Pours as low as  $46^\circ F$ . Emulsol.

**345) PETRONIC ACID** — A petroleum sulfonic acid, suggested for use as basic starting material for various metal salts of petroleum sulfonic acids. Mw (as sulfonic acid): 418-438. Acid No. is 70 mg KOH/gm. Sonneborn Sons.

**346) m-PHENOLS** — Light-colored mixture of reactive cresols, xlenols, ethyl phenols. Meta-Phenols 220 is used as Mercerizing penetrant; and in making disinfectants having high phenol coefficients; light-colored phenolic resins for varnish, laminating, and metal cleaners; paint driers; vinyl stabilizers. Color  $<2.0$  Gardner. High color stability. BP: 213-237. Union Carbide.

**347) 2-PHENYL-5-BIPHENYLYLOXADIAZOLE** — Solute for liquid scintillation counting fluoresces in UV light producing 3700A wavelength. Lab-scale. Arapahoe Chemical.

**348) PHENYL IODIDE** —  $C_6H_5I$ . Intermediate. 95-98% pure. MP:  $-29$  to  $-31^\circ$ . BP: 185-189°. Eastern Chemical.

**349) 4-PHENYLBENZOYL CHLORIDE** — Used to introduce 4-phenylbenzoyl group. Tech. Exp. Arapahoe Chemical.

**350) PHENYLFLUORONE** — A sensitive colorimetric reagent for Ge. Jasonols.

**351) PHENYLMERCAPTOACETIC ACID** — 98% (min)  $C_6H_5O_2S$ . MP: 63-66°. Presence of S atom leads to unusual properties. Synthesis of pharmaceuticals. Crystals. Trubek Labs.

**352) PHENYLSUCCINIC ACID** — Pharmaceutical, dye intermediate.  $C_6H_5CH(CH_2COOH)COOH$ , 99% (min). Melts: 166-167°. Sol: hot water, ether. Exp. Kay-Fries.

**353) PHOSPHATES, DEFLUORINATED** — Contains a minimum of 17% P, 34% Ca, with a max of 0.17% F. Used as mineral supplement in stock and poultry feeds, mineral is substantially 100% biologically available. Non-hygroscopic. P is predominantly in form of alpha-tricalcium phosphate. Coronet Phosphate Co.

(Continued on page 62)

get acquainted with

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**PURE RED IRON OXIDES**

OUR NEW **100** SERIES

Available in 6 Shades ranging from  
a Light Salmon-Red to a Medium Maroon  
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When inquiring check CP 6124  
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## Materials

### High molecular weight tertiary amine offered as starting material

Offered as a starting material for derivatives used in agricultural sprays, germicides, fungicides, quaternary ammonium compounds, wetting agents, and corrosion inhibitors, Fatchemco-O is heat-stable and oil soluble. This high molecular weight tertiary amine is yellow in color and has a high boiling point.

(Tertiary amine is a product of Universal Chemicals Corp., Dept. CP, Mill St., Lonsdale, Rhode Island . . . or check CP 6125 on handy form opposite last page.)

### Pressure-sensitive adhesives

Four-page technical bulletin gives background and know-how of pressure-sensitive adhesive formulating.

"Pressure-Sensitive Adhesives" is issued by Pennsylvania Industrial Chemical Corp., Dept. CP, PO Box 240, Clairton, Pa. Check CP 6126, opposite last page.

### "THAT'S INTERESTING"

#### Piscicide improves angling

Oregon's Diamond Lake was the scene of a mass murder last September. The weapons were two forms of rotenone — the victims were millions of roach, a form of carp, which had slowly forced the famous Diamond Lake trout out of existence by depleting the food supply.

The chemical killers used were powdered Cubé and Liquid Noxfish, both supplied by S. B. Penick (New York.) Of course, all fish, good and bad, were killed, but the 3000 acre lake has since been re-stocked with 100,000 trout. Anglers next summer will owe a vote of thanks to the chemical industry for their catches.

For more information on product at right, specify CP 6127 . . . see information request blank opposite last page. ➡

## GET THIS *NEW* CHEMICALS CATALOGUE by return mail!

Antara presents a new and completely revised edition of its chemical catalogue, giving basic information on the chemicals it produces.

Information on chemical composition, physical properties and application is given on the established products and on new chemicals released in the past few months. In addition, there is a listing of Antara's intermediates:

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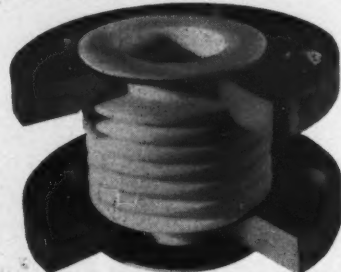
# DORE'

## TEFLON\* BELLOWS AND TEFLON FLEXIBLE COUPLINGS

• These bellows and flexible couplings are the answer to movement and misalignment in piping carrying a wide range of corrosive commodities. Dore's quality control assures accurate dimensions, uniform density and wall thickness — rigid testing and inspection guarantees adherence to these controls.

### BELLOWS STYLE E-8

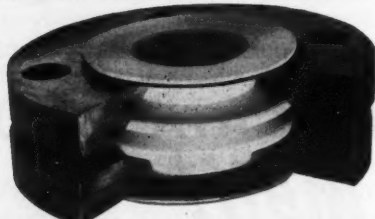
Rounded Convolutions • No Corners • Uniform Wall Thickness



Inert to a wide range of commodities, Dore's Style E-8 TEFLON Bellows are recommended for maximum working pressures of 50 p.s.i. and temperatures of 150° F. They absorb shock, vibration and movement caused by thermal expansion and contraction in piping systems. Style E-8 TEFLON Bellows are furnished with integrally gasketed standard 125-lb. steel flanges. They are available with diameters 1" through 20", in lengths from 1 1/2" to 60".

### FLEXIBLE COUPLINGS STYLE E-8-S

Rounded Convolutions • No Corners • Uniform Wall Thickness



Dore's TEFLON Flexible Couplings are made with only two convolutions and will operate successfully where there is a minimum of vibration or misalignment. Style E-8-S Flexible Couplings are ideal where there is only a small amount of movement or misalignment. They are an easy to install, economical, inert coupling for these services. MAXIMUM WORKING PRESSURE 50 P.S.I. MAXIMUM WORKING TEMPERATURE 150° F. They are available with diameters 1" through 20", in lengths from 1 1/2" to 2 1/2".

\*TEFLON is E. I. du Pont's registered trademark for Tetrafluoroethylene resin.

*John L. Doré Co.*

SALES AGENTS IN U.S.A. FOR JOHN L. DORE, INC.  
Du Pont's Teflon • Kellogg's Kel-F • Hi-Quality Nylon  
P. O. BOX 7772 • HOUSTON 7, TEXAS

When inquiring check CP 6128 opposite last page

## new chemical materials

nos. 354 to 388

(Continued from page 60)

354) PHOSPHORUS PENTASULFIDE — Distilled  $P_2S_5$  for making oil additives, frothing and flotation agents, and organics. High purity, canary yellow color. MP: 286-290°. BP: 513-515°. Sl. Sol:  $CS_2$ . Victor Chem. Works.

355) PHTHALALDEHYDE ACID —  $C_8H_6O_4$  of 98% purity makes organic chemicals, pharmaceuticals. MP: 97°. Sol: water, alcohol. National Aniline.

356) PHTHALALDEHYDIC ACID — 2- $CHO_2C_6H_4-1-COOH$ . MP: 98-100°. Believed useful in many condensations. Dist. Prod.

357) PHTHALATE ESTER PLASTICIZER — Flexol Plasticizer 810, a mixed phthalate ester of higher alcohols, imparts improved low-temp properties, reduced volatility, excellent electrical characteristics to vinyl chloride resin compounds. BP: 245° @ 5 mm. Sets to glass below -80°. Union Carbide.

358) PHTHALATE ESTER PLASTICIZER — Flexol Plasticizer 812 gives low-temp flex, excellent electrical characteristics, water extraction resistance to vinyl chloride plastics. Primary plasticizer is a mixed phthalate ester of higher alcohols. Toxicity is low. BP: 245° @ 5 mm. Sets to glass below -80°. Union Carbide.

359) PHTHALAZONE — Used as organic intermediate, esp. pharmaceuticals.  $C_8H_6N_2O$  has 98% purity, MP of 186°. National Aniline.

360) PHTHALIDE —  $C_8H_6O_3$ . 98% pure. MP: 71°. Sol: alcohol. Sl. sol: water. For organics, esp. pharmaceuticals. National Aniline.

361) 4-PICOLINE-N-OXIDE —  $C_7H_7NO$ . Intermediate. Reacts readily with electrophilic reagents. Reilly Tar.

362) PIGMENT/WATER MIXTURES — Stir-In Pulp Colors for pigmentation of emulsion paints. Does not require grinding. Come in yellows, reds, green, blue. Will not affect paint washability. Sherwin-Williams.

363) PLASTICIZER FOR VINYL SPONGE — Called RS-1322. It is a prestabilized plasticizer for free-blown vinyl sponge. Ohio-Apex of FMC.

364) POLYACRYLIC SOLUTION — Ubatol U-3051, a soluble polyacrylic solution, reduces packing of dispersions, reduces or eliminates pigment separation or floating, stabilizes pigment grinds. Uses: Pigment dispersion, stabilizing agent, grinding medium. Union Bay State Chem.

365) POLYAMIDE RESIN — Resin 115 is a pure polyamide resin, non-volatile, and melting <25°C. Uses: Coatings, adhesives, castings, pottings. Reacts with, cures, and modifies epoxy resins — adding toughness, resilience. Toxicity: Has given no dermatitis problem during extensive working period. Sol: Alcohols, chlorinated and mixed solvents. General Mills.

366) POLYETHYLENE GLYCOL — A high-mw wax-like material, Carbowax Polyethylene Glycol 20M has good lubricating properties. Softens at 59-61°, sol in water is 55 gm/100 ml @ 25°. Sl. sol: aromatics. Insol: aliphatics. Uses: thickening, binding, suspending agent in textile, paper, ceramic, specialty products; rubber mold lubricant. Union Carbide.



367) POLYETHYLENE GLYCOL DIBENZOATES — Series of four Benzoflex compounds. Compatible with phenol formaldehyde resins, min purity is 98%. Insol: aliphatics; sl. sol: water; sol: aromatics. Benzoflex P-200 and P-300 are described below. P-400 melts: -35°, boils with decomposition at 258° @ 1 mm. P-600 melts: 3.8°, boils with decomposition at 200° @ 1 mm. Tennessee Products.

368) POLYETHYLENE GLYCOL 200 DIBENZOATE — Benzoflex P-200 plasticizer is compatible with phenol formaldehyde resins. Min purity: 98%. Melts: -35°. Boils @ 1 mm: 217-290°. Insol: aliphatics. Sl. sol: water. Sol: aromatics. Exp. Tennessee Products.

369) POLYETHYLENE GLYCOL 300 DIBENZOATE — Available on experimental basis, plasticizer Benzoflex P-300 is compatible with phenol formaldehyde resins. Min purity: 98%. MP: -35°. BP: 243-327 @ 1 mm. Insol: aliphatics. Sl. sol: water. Sol: aromatics. Tennessee Products.

370) POLYGLYCOL — Polyglycol E 500 M finds use as humectant; intermediate for plasticizer, cosmetic vehicle. MP: 38-41°. Dow Chem.

371) POLYGLYCOL — Polyglycol E 1450 makes cosmetic vehicles, plasticizers. Melts: 43-46.0°. Dow Chemical Company.

372) POLYGLYCOLAMINE H-163 —  $HOC_6H_4OC_6H_4OC_6H_4NH_2$ . For preparation of amides of fatty acids for organic builders for detergents; making emulsifiers and dispersants for pigments, dyes, emulsion polymers; pharmaceutical syntheses. Sol: water. Miscible: common organics. BP: 278°. Union Carbide.

373) POLYISOCYANATE RESIN — Foam-in-place resin cures by itself, is applicable as insulation, sandwich construction of prefab building panels, potting compound. Two-part, IPI-Isofoam expands to foams ranging from 2 to 20 lb/cu ft. Isocyanate Prod.

374) POLYOXYETHYLATED FATTY ALCOHOLS — Nonionic dyeing assistants. Rexan O gives level dyeing, penetration with direct, basic, vat dyestuffs on all fibers except wool. Dextrol Fast Salt M with acid metalized dyestuffs on wool, cuts  $H_2SO_4$  requirement. Telkanol — O is used with unions of wool and synthetic fibers, wool, cotton, furs. Dexter Chem.

375) POLYSILOXANE EMULSION — Ingredient in textile and leather water-repellent finishes, Norane S is compatible with resins, is durable to dry cleaning, has improved crush-, abrasion-, and tear-resistance. Water dispersible. Warwick Chem.

376) POLYSTYRENE EMULSION — Ubatol U-2001, modified polystyrene emulsion of extreme fine particle size imparts water-resistance to film. Used in floor wax compounding, paper coating, latex paints, textile anti-soils. Union Bay State Chem.

377) POLYSTYRENE FOAM — Expandable Polystyrene Beads foam at 100-135°. Density can be controlled to make 2-10 lb/cu ft foams. Uses: insulation, sandwich constructions, molding, sheeting, packaging and electrical applications. One-step operation. Koppers Company, Incorporated.



## Materials—Feature Section

378) **POLYSTYRENE SOLUTION** — Polyco 560, 50%-solids plasticized polystyrene solution, for coating, textile finish, adhesive applications. Borden Co.

379) **POLYVINYL ACETATE COPOLYMER** — Everflex G for emulsion paint base in exterior masonry and interior water-base paints. Imparts high scrub-resistance, permanently flexible film. Dewey & Almy.

380) **POLYVINYL ACETATE COPOLYMER EMULSION** — Resyn 22K11 is base for non-woven cloth binder. 55% dispersion in water. Dry films are water-, grease-resistant. Imparts superior wet strength. National Starch.

381) **POLYVINYL ACETATE COPOLYMER SOLUTION** — Called 12L44. Internally plasticized base for laminating adhesives. Has 40% solids in organic solvents. Adheres to synthetic sheetings. Permanent flex. National Starch.

382) **POLYVINYL ACETATE EMULSION** — Nopco Resin VA is a 55%-active water-dispersible polyvinyl acetate emulsion. Used in cotton finishing and adhesive formulations, emulsion possesses non-yellowing qualities. Nopco Chem. Co.

383) **POLYVINYL ACETATE EMULSION** — Polyco 612, a 60%-solids polyvinyl acetate emulsion, has fine particle size, is slow-settling. Borax-stable, emulsion is recommended for adhesive formulations, textile finishing applications. Borden Co.

384) **POLYVINYL ACETATE EMULSION** — Recommended for a base in adhesive formulations, finishing applications, heat seal coatings. A 55%-solids polyvinyl acetate emulsion, Polyco 577-G has outstanding water resistance. Fine particle-type emulsion, viscosity is 1100-1600 cps. Borden Co.

385) **POLYVINYL ACETATE EMULSIONS** — Line of PVA emulsions are generally 55%-solids dispersions in water. Weight per gallon: approx. 9.2 lb. Esp. recommended for adhesives, since their excellent compatibility with plasticizers, thickeners, and various extenders permits formulation into fast-setting glues. Another class of PVA emulsion is for water-resistant coatings, water-based paints. Particle size is fine. These free-filming-type emulsions are stable upon dilution. Paisley Products.

386) **POLYVINYL ACETATE RESINS** — Seven grades of Lemac PVA resins have MP from 104° and up. Compounds are non-toxic, are 100% PVA. Impart high gloss, clarity, adhesion, and strength. Used in adhesives, coatings, hot melts, leather finishes, printing inks, and sizes for textiles, felt, straw. American Monomer Corp.

387) **POTASSIUM TETRATHIONATE** —  $K_2S_2O_8$ . Mild reducer. Purity: 98-100%. Sol: water. Exp. Eastern. Chem.

388) **PRIMARY AMYL ACETATES** — Contains acetates of pentanol-1, 3-methyl butanol-1, 2-methyl butanol-1. BP: 140-149°. Purity: 95%. Moderate-boiling solvent for nitrocellulose lacquers; penicillin extractant; formulation of specialty lacquers for leather finishes, textile sizes, paper coatings. Union Carbide.

(Continued on next page)

### unless otherwise specified

- 1) Commercial quantities are available ("Exp" indicates otherwise)
- 2) Pressures are in mm of mercury (abs.)
- 3) Boiling points are at 760 mm
- 4) Temp is in °C
- 5) Solubilities are at "room temp"



General Mills Fatty Amines Help Make FABRICS...

## soft as a child's whisper

Here's the softest touch you can find! It's the touch of harsh fabrics—natural or synthetic—made whisper-soft with organic-chemical finishes.

General Mills now offers an assured source of chemical intermediates for textile finishes—fatty amides, amines, amine acetates, nitriles, fatty acids—designed for either direct use or further processing... for soft, flowing fabrics or other textile benefits.

Textile finishes made with Alamide (fatty amide) H-26, for example, make hats... raincoats... children's play clothes permanently water repellent. They add antistatic and wrinkle-resistant properties, and help improve the "hand" and drape of the cloth.

General Mills Alitrile (fatty nitrile) 7-D makes finishes that plasticize synthetic fibers... others that

lubricate yarns for spinning. As a starting material, it's used to synthesize water repellents for cotton and rayon—with excellent color and color stability that stands up in processing.

The fatty amines are readily converted to quaternary ammonium compounds and other cationic surface-active agents. These amines, and their derivatives, are highly

effective in acid solutions such as acidic dyes... assure rapid, uniform penetration of dyes into the fiber.

General Mills also offers hydrogenated tallow and a wide range of fatty acids that give product or production benefits in textile processing. Examples of applications are economical scouring soaps, warp sizing, textile lubricants, and non-permanent water repellents.

We manufacture complete lines of Polyamide Resins, Fatty Acids and Fatty Nitrogen Compounds for industrial uses.

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Kankakee, Illinois

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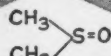
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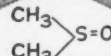
# Dimethyl Sulfoxide

with many unusual advantages

STEPAN



STEPAN



STEPAN

Dimethyl Sulfoxide, now available in pilot plant quantities, is a clear, water-white, very hygroscopic and completely water soluble liquid. It is believed to be non-toxic, has practically no odor, and only a slightly bitter taste. Despite being water soluble it dissolves many organic com-

pounds and is unusually selective in its solubility characteristics for hydrocarbons. Also of particular interest are the high boiling point, high flash point, and the low freezing point, (in eutectic mixtures with water) of Dimethyl Sulfoxide. Listed below are a few of its potential uses.

## Potential uses

- ◆ Solvent for acetylene . . . absorbs 32% more acetylene than acetone . . . 3 times longer life in acetylene cylinders.
- ◆ Selective separation of paraffinic and aromatic hydrocarbon mixtures. Also for desulphurization of gasolines.
- ◆ Solvent for certain synthetic fibres such as polyacrylonitrile and acetate rayon as well as others.
- ◆ As anti-freeze or hydraulic fluid when mixed with water. (Offers possible cost savings.)
- ◆ As paint and varnish remover. Also nail polish remover.
- ◆ Possibly useful as diesel fuel additive. (Raises cetane number.)

## Physical Properties

Dimethyl Sulfoxide

Molecular weight	78
Melting point	18.45°C (supercools easily)
Boiling point (760 mm)	189°C
Spec. gravity (20°C)	1.100
Refractive index (n <sub>D</sub> <sup>20</sup> )	1.4787
Vapor pressure	at 20° 30° 47.4° 56.6°C mm .37 .79 2.82 5.11
Viscosity 27°C	1.1 cps
Specific heat	.5 cal/g as solid .7 cal/g as liquid
Heat of vaporization	ca 175 cal/g
Heat of solution	60 cal/g
Heat of fusion	20 cal/g
Heat of combustion	6050 cal/g
Flash point (°C)	95° (open cup)
Coefficient of expansion	.00068
Dielectric constant	45

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Telephone: CEtral 6-5511

## Materials-Feature Section

new chemicals — 389 to 420

(Continued from preceding page)

389) PRIMARY AMYL ALCOHOLS — Uses: preparation of ore flotation agents, diesel fuel additives, plasticizers, lacquer solvents, surface-active agents. Contains only primary amyl alcohols, boils at 133.1°, sets to glass below -90°. Purity: 98% min. Union Carbide.

390) PROPARGYL CHLORIDE — 96% min CH<sub>2</sub>CH<sub>2</sub>Cl. Soil fumigant; chemical intermediate for terpenes, pharmaceuticals. Freezes: -76.9°. Boils: 55.5-57.1°. Sol: benzene, CCl<sub>4</sub>, ethanol. Insol: water. Exp. General Aniline.—Com. Devel.

391) PROPYLENE GLYCOL ALGINATE — Kelco-loid O is an improved stabilizer of beverage foams. Food grade. Soluble and stable at low pH. Kelco.

392) PROTEOLYTIC ENZYME — Bromelain is suggested for use as a desizer for textile industry. Other applications in food industry. Activity: 2000-3000 milk clotting units per gram. General Biochemicals.

393) PULVERIZED MELAMINE — Finely pulverized C<sub>3</sub>N<sub>6</sub>H<sub>6</sub>. 99% through 200-mesh. Deodorizer in foam rubber products. American Cyanamid.

394) PURINE — C<sub>5</sub>H<sub>4</sub>N<sub>4</sub>. A rare organic for biochemical research. Exp. Krishell Labs.

395) PYRIDINE-N-OXIDE — C<sub>5</sub>H<sub>5</sub>N→O. Intermediate readily reacts with electrophilic reagents. Reilly Tar.

396) PYRUVIC ACID — CH<sub>3</sub>COCOOH. 99%. Uses: semicarbazone splitter; manufacture of esters, cinchonine, other organics. MP: 11°. BP: 163-165° @ 13 mm. Low toxicity. Sol: water. Brothers Chem.

397) QUADROL — N,N,N',N'-Tetrakis(2-hydroxypropyl)- ethylenediamine is used directly as a plasticizer, humectant. Intermediate for emulsifiers, surface-active agents, pharmaceuticals, herbicides, fungicides, insecticides, plasticizers, resins. Of 99+ % purity (tert-amine assay), water-white liquid has six chemically reactive centers, is exceptionally heat-stable. BP: 225° @ 5 mm. Sol: water, alcohol, toluene, perchloroethylene. Sl. sol: kerosene, mineral or vegetable oils. Wyandotte.

398) QUINALIZARIN — Be, Mg, Al, B reagent. Eastern Chem.

399) RADIOISOTOPES — I<sup>131</sup>, P<sup>32</sup>, S<sup>35</sup>, Sr<sup>90</sup> have purities of 99%. Analytical tools in processing, pipe line tracing, fluid catalyst flow rate meas. Exp. Bio-Rad.

400) RICINOLEYL ALCOHOL — C<sub>22</sub>H<sub>42</sub>O<sub>2</sub>. Adol 40 has 88% purity, finds use as intermediate for polyesters, surface-active agents, other organics. Pilot plant quantities, boiling 170-328°. Cloud point <10°F: A-D-M.

401) ROSIN AMINE PETRONATE — An ashless amine salt of a petroleum sulfonic acid, soluble in petroleum solvents and oils, ethers, ketones, long chain aliphatic alcohols. Uses: Rust, corrosion preventive for light hydrocarbon distillate systems. Supplied at 52% concentration, mw is 709. Sonneborn Sons.

402) RUBBER LUBRICANT — Silver Lube RL is a 50%-solid micro-crystalline wax. Imparts lubricity, prevents age-cracking, reduces roll-sticking in rubber formulations. Carolina Aniline & Extract.

403) RUST INHIBITOR — Oil Soluble Rust Inhibitor RD-155 for gasoline, fuel oil, other distillates, and metal cleaning solvents. Forms a monomolecular film on metal surfaces, excluding air and moisture. Ashless. Sinclair.

404) SEED DISINFECTANTS — For use in seed treaters to protect grain and cotton seeds against certain seed-borne and soil-borne diseases. Liquid 244 for ready-mix treaters; 364 for slurry-type treaters. Active ingredients: ethyl and phenyl mercury acetates. DuPont.

When inquiring check CP 6130 opposite last page



## Materials—Feature Section

405) **SHELL-MOLDING RESIN** — Phenolic resin, designated 12374, for mixing with foundry sand in production of shell molds. Fast-curing, its rigid-set properties on ejection help minimize shell warpage. Fills intricate areas well, has good buildup characteristics, hot-rigidity. GE.

406) **SILICA** — Cab-O-Sil is 99.0-99.7%  $\text{SiO}_2$ , with low water content. Particle size: 0.015-0.020 micron. Surface area is 175-200 sq m/gm, with no internal surface area. In automotive enamels, compound acts as a transparent extender. Other uses: Reinforcing agent in rubber and plastics, suspending agent in paints and paper, flattening agent in varnishes and lacquers, thickening agent in greases, thixotropic agent in resins, anticaking agent in sulfur and DDT, antislip agent in waxes, and anti-blocking agent for cellophane. Easy to disperse. Continued excessive inhalation of dust should be avoided. G. L. Cabot.

407) **SILICA** — Seneca Standard Tripoli, a form of silica, is double refracting, of chalcedony variety. Avg. particle size  $<10\mu$ . Used in polish, detergent, cleaning, foundry parting formulations. Carborundum Co.

408) **SILICA** — Silica has small particle size; high surface, oil absorption. Pelletized, friable, easy-dispersed. Uses: filler for rubber, flattening agent for paints, thickener for greases. Purity:  $>99\%$ . Dow Corning.

409) **SILICA** — Syloid® 72 is used as plastic flattening agent, in paper coatings to provide "tooth," and as an anticaking agent. 99.7%  $\text{SiO}_2$  (dry). Davison Chem.

410) **SILICA** — Syloid® 244 is  $\text{SiO}_2 \cdot x\text{H}_2\text{O}$ , 99.7% (dry). Plastic thickener, antiblocking agent. Anticaking agent for powdered chemicals. Flattening agent for artificial leather. Davison Chem.

411) **SILICONE LUBRICATING FLUID** — 81406 Fluid combines excellent lubricity with high thermal stability, low viscosity-temp coefficient. Exp. GE-Chem Division.

412) **SILICONE POLYMER** — 806 Resin used as vehicle for silicone paints. Good flex, color retention at  $500^\circ\text{F}$ . Sol: aromatics. Dow Corning.

413) **SILICONE POLYMER** — 840 Resin. Vehicle for modified silicone paints. Compatible with organic vehicles. Dow Corning.

414) **SILICONE POWDER MIXES** — R-7001, -7002, -7003 are non-toxic, ready-to-use. For making rigid, heat-stable foam structures. Dow Corning.

415) **SILICONE RESIN** — For moisture-resistant surface coatings for electrical coils, components. Dri-Film 88 improves insulation-, humidity-, salt spray-resistance. GE-Chem Div.

416) **SILICONE RESIN** — Raw material for masonry water-repellent formulations. Dri-Film 103 imparts extreme water-repellency to brick structures. GE-Chem Div.

417) **SILICONE RESIN** — SR-111 Silicone Resin. Uses: resin vehicle in formulation of high-temp paints for smokestacks, space heaters. Has heat-resistance, gloss-retention. GE-Chem Div.

418) **SILICONE RUBBER COMPOUND** — Ease of processing, high dielectric strength of SE-965 suits it for extrusion over wire as a primary insulation. GE-Chem.

419) **SILICONE RUBBER COMPOUNDS** — SE-370 and SE 380. For fabricated silicone seals, O-rings. Have very low compression-set, low shrinkage. GE-Chem Div.

420) **SILICONE RUBBER GUM** — 81477 Gum compounded with fine silica fillers gives exceptional tear-resistance and strength. Exp. GE-Chem Div.

(Continued on next page)

## A new star on the chemical horizon NITROPARAFFINS



In the starred area above, construction has started on the new five million dollar plant for the commercial production of the Nitroparaffins and their remarkable family of derivatives. The new plant, the first major step in the company's Nitroparaffin expansion program, is expected to go on stream August 1955.

Located at Sterlington, Louisiana, the new plant is surrounded by CSC's great petrochemical facilities, from which such useful and basic products as methanol, ammonia, and nitric acid flow to all industry. In addition to the new NP plant, existing facilities at Peoria, Illinois, are being expanded.

Virtually laboratory curiosities a few years ago, the

Nitroparaffins have been under study since 1935 in a continuing program of experimental production and evaluation. The four Nitroparaffins and six derivatives, which have already been produced and been proven useful in a wide range of applications, represent only a small fraction of the total number of derivatives under current investigation. The new chemicals represent a unique field of organic chemistry and hold unusual promise for virtually every industry.

The experience of Commercial Solvents Corporation in evaluating these versatile chemicals is available on request to every manufacturer.

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## ARE YOU A NUISANCE TO YOUR COMMUNITY?

You are, indeed, if factory fumes or foul odors originating in your plant are causing discomfort to those who live or work in nearby areas. Of course you don't want to be a nuisance, nor do you have to be, even though the conditions confronting you be no less objectionable than those of the leather tanner, the brewer, the fat renderer or the disposer of cannery wastes for whom we have developed effective aromatic neutralizers and economical methods of odor control....If you have any kind of an odor problem, whether that of producing sales-stimulating scents or the masking of unpleasant ones—our laboratories will gladly help you.

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opposite last page

## Materials—Feature Section

new chemicals — 421 to 446

(Continued from preceding page)

421) **SILICONE RUBBER GUM** — SE-30 is a base polymer for mixing silicone rubber compounds to make fabricated parts. Has low shrinkage, is thermally stable. GE-Chem Div.

422) **SILVER (II) OXIDE** — 93% AgO. Use: manufacture of precharged silver-zinc batteries. Poisonous. Explodes on heating. Sol: cold HNO<sub>3</sub>. Merck.

423) **SODIUM ALGINATE** — Margel is a mixture of Na alginate and gelling salt. Non-toxic. Food uses. Gives controlled jelling time, has excellent water-holding properties. Kelco.

424) **SODIUM ASPARAGINATE** — C<sub>4</sub>H<sub>6</sub>NO<sub>2</sub>Na. Tech. CP. Sol: water. Exp. City Chem. Corp.

425) **SODIUM BORATE PRODUCT** — FR-28 as flame-retardant in latex-base paint compositions. Contains approx. 66% B<sub>2</sub>O<sub>3</sub>, has uniform composition. Aq. solns are mildly alkaline at low concentrations, near-neutral as concentration increases. 96.8% passes 200 mesh screen. Pacific Coast Borax.

426) **SODIUM DI OCTYL SULFOSUCCINATE** — Aerosol OT. Clear viscous liquid, 78% solids. Excellent wetting, foaming, solubility, emulsion-promoting power. Well suited to most OT uses, except in anhydrous systems. Uses: emulsion polymerization, textile specialties, pharmaceutical making, catalyst making, ceramics, detergents, antiseptics, making emulsions, cosmetics, photographic preparations, emulsion-breaking inks, paper making. American Cyanamid.

427) **SODIUM DITHIONATE** — Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub> · 2H<sub>2</sub>O. 98-100% pure. Sol: water. Mild reducer. Exp. Eastern Chem.

428) **SODIUM FERRIC ETHYLENEDIAMINE TETRA-ACETATE** — Nullapon NaFe-13. An iron chelate to correct iron deficiency of crops grown on acid soils, for application in fertilizer mixtures or other diluted forms. Assay: Fe 13%. General Aniline — Antara.

429) **SODIUM HYDROXYSTEARATE** — C<sub>18</sub>H<sub>35</sub>O<sub>2</sub>Na. Tech, purified grades. Sol: hot water. Exp. City Chem. Corp.

430) **SODIUM LAURYL SARCOSINATE** — Water-soluble, cosmetic grade. Used in tooth paste formulations. Of 35% purity, it is stable. Warwick Chem.

431) **SODIUM LAURYL SULFATE** — Called Solasol, the compound, C<sub>12</sub>H<sub>25</sub>SO<sub>4</sub>Na, is supplied in needle form, dustless, as well as standard powder form. Used as detergent, emulsifier for pharmaceutical, textile, detergent manufacture. Aceto Chem Co.

432) **SODIUM LAURYL SULFATE** — Pendent WA Cosmetic yields highly uniform results on formulation into shampoos. Chemical formula: C<sub>12</sub>H<sub>25</sub>OSO<sub>3</sub>Na. Non-toxic. Raymond Labs.

Use-index for all these products starts on page 80. See it first if you're after a chemical material for a specific use. It's cross-indexed with this list.

Manufacturer address list starts on page 82. Use it when writing for more information on materials which interest you.

# Xtracts

USEFUL INFORMATION ABOUT REACTIVE CHEMICALS  
FROM THE DU PONT ELECTROCHEMICALS DEPARTMENT.

## "Elvadex"...An Unusual Vinyl Polymer

Here's a vinyl polymer with a dual personality. It's readily soluble in aqueous alkali solutions and common organic solvents, but insoluble in acidic or neutral solutions.



This unique solubility points to a number of industrial applications—including textile sizing and finishing, paints, paper coating and adhesives.

Clear, glossy films can be produced from solutions of "Elvadex" in either aqueous alkali or organic solvents. A wide variety of softeners, plasticizers, extenders, etc. may be used to modify the properties of these solutions and films.

Films produced from ammonia solutions are water-insoluble, since the ammonia evaporates as the solution dries; films from solutions in organic solvents are also water-insoluble.

A new technique for finishing doyed acetate yarns—application of size and finish at the slasher—became practical with the commercial production of "Elvadex". Applied from ammonia solution, "Elvadex" protects the yarn during weaving... provides a durable finish which does not water-spot.

Excellent adhesion, toughness and flexibility is shown by "Elvadex" sizes for filament yarns of "Dacron" polyester fiber. After weaving, the fabric is readily scoured in warm water containing a small amount of alkali.

Being a vinyl acetate copolymer, "Elvadex" retains some of the adhesive properties of polyvinyl acetate. Aqueous alkaline solutions are frequently simpler to apply to porous materials like paper and wood than emulsions. Temporary protective coatings are easily removed by washing with dilute alkaline solutions.

The properties of "Elvadex" solu-

tions suggest their use as pigment dispersing agents, thickeners and leveling agents for latex paints.

Paper coatings made from "Elvadex" solutions are greaseproof and have a high gloss. Coatings applied from ammonia solutions are water-resistant; pigments, dyes and colors can be put into the coating mixes.

Other possible uses for "Elvadex": Leather finishing compounds, flow improver in emulsions type floor waxes. Alcoholic solutions of "Elvadex" are suggested for evaluation in flexographic type inks.

For more information about "Elvadex" check the coupon.

## More Uses For Hydrogen Peroxide

Frequently, we become so used to thinking of a familiar chemical in its most common role that we are inclined to overlook its other possibilities.

Take hydrogen peroxide, for example. While better known as an oxidizing agent, it can also serve as a strong reducing agent. Under the proper conditions, it reduces cupric salts, silver and gold oxides, vanadic acid, periodates, bromates, etc.—generally with a liberation of oxygen.

Many organic reactions are also possible with this versatile chemical: It can add on to ethylenic hydrocarbons to produce glycols... form organic peroxides from organic chlorides. For example, benzoyl peroxide is formed from benzoyl chloride. With organic acids, hydrogen peroxide forms peracids—useful for converting olefins to epoxides or hydroxy compounds.

"Albone" is an aqueous hydrogen peroxide solution, available in grades containing 35% and 50% by weight H<sub>2</sub>O<sub>2</sub>. It is water-white, stable, and contains no organic stabilizers.

For more information about "Albone", mail the coupon.

Furan—

Usually w behavior  
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## Furan—A New Conjugated Diene



Usually written to show aromatic behavior, furan often reacts like butadiene and might better be formulated. With maleic anhydride and other dienophiles furan forms normal addition compounds leading to physiological active molecules.

Halogens in alcohols react by 1,4 addition, forming 2,5-dialkoxy 2,5-dihydrofurans—convenient sources of maleic and succinic dialdehydes.

Cyanogen bromide first adds 1,4 to furan, then, by elimination of either hydrogen bromide or hydrogen cyanide, forms 2-cyano or 2-bromo-furan. Nitration with nitric acid in acetic anhydride proceeds in an analogous fashion, giving 2-nitro furan.

With ethyl, phenyl or thienyl sodium, furan reacts to form 2-furyl sodium. Reaction with potassium or sodium-potassium alloy gives 2-furyl potassium. Amyl sodium introduces two sodium atoms in the furan ring and subsequent carbonation gives 2,5-furan dicarboxylic acid.

For more information about this reactive compound, mail the coupon.

### To Introduce Nitrile Group—Use NaCN



The highly versatile nitrile (CN) group is becoming increasingly important in chemical syntheses. It

offers a convenient method for adding another carbon atom to an organic compound and makes possible a variety of reactions leading to a host of products, including dyes, pharmaceuticals, fibers and plastics. Quite often, the most practical way to introduce the (CN) group is through the use of high purity NaCN.

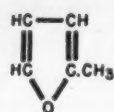
E. I. du Pont de Nemours & Co. (Inc.)  
11507 Nemours Bldg., Wilmington, Del.

Please send me literature and information on:

- ☐ Furan
- ☐ Hydrogen Peroxide
- ☐ "Elvadex" Vinyl Polymer
- ☐ Sodium
- ☐ 2-Methyl Furan
- ☐ 2-Methyl Tetrahydrofuran

## New Products

### 2-Methyl Furan



Colorless, mobile liquid with an ether-like odor; b.p. 64°C., f.p. -88°C.

2-Methyl furan is a cyclic diene offering interesting possibilities as a chemical intermediate.

Hydrogenation-hydrolysis yields

gamma-acetopropanol,  $\text{CH}_3\text{C}(\text{O})\text{CH}_2\text{CH}_2\text{OH}$ .

Hydrolysis alone yields levulinic

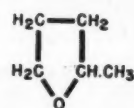
aldehyde,  $\text{CH}_3\text{C}(\text{O})\text{CH}_2\text{CH}_2\text{CHO}$ .

Diels-Alder reaction with maleic anhydride yields the expected product, 3-methyl-3,6-endoxytetrahydrophthalic anhydride.

Mannich reaction with formaldehyde and amines occurs at the unsubstituted alpha carbon atom, giving N-substituted furfuryl amines.

Other reactions of 2-methyl furan are described in Bulletin No. 24.

### 2-Methyl Tetrahydrofuran

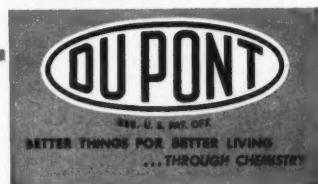


Colorless, mobile ether; b.p. 80°C., f.p. -136°C.

2-Methyl tetrahydrofuran is similar to tetrahydrofuran in its chemical reactions. It can be dehydrated at reduced pressures to form piperylene (1,3-pentadiene), which can be converted to a rubber-like polymer. Reaction with hydrogen sulfide yields alpha-methyl tetrahydrothiophene.

2-Methyl tetrahydrofuran is an excellent solvent for rosin, natural gums, ethyl cellulose and—at elevated temperatures—vinyl chloride-acetate copolymers.

Write for Bulletin No. 29.



CP-4

Name \_\_\_\_\_  
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## Materials—Feature Section

433) SODIUM LIGNOSULFONATES — Polyfons are a series of surface-active agents. Available in five grades with varied extents of sulfonation, they have somewhat different properties. Made from purified pine wood lignin, are brown, free-flowing amorphous powders sintering above 360°. Per cent sodium sulfonate groups ranges from 5.8 to 32.8. Non-toxic. Very sol in water. Uses for various members include: dispersant, wetting agent, battery plate expander, foam stabilizer, crystallization inhibitor. Intermediates for insecticides, textiles, ceramics, fire foams. West Va. Pulp & Paper.

434) SODIUM *m*-NITROBENZENESULFONATE —  $\text{NO}_2\text{C}_6\text{H}_4\text{SO}_3\text{Na}$ . Intermediate. Sol: water. Purity: 70% min. Reasonably stable. Monsanto.

435) SODIUM OLEOYL METHYL TAURIDE — Sulfanole S Slurry as textile dyeing assistant and detergent, leather degreasing agent, pulping assistant on old paper. Resistant to hard water, acids, alkalis, and electrolytes. Water soluble, purity is 28.5-29.5%. Formula:  $\text{C}_{17}\text{H}_{35}\text{CON}(\text{CH}_3)\text{C}_6\text{H}_4\text{SO}_3\text{Na}$ . Warwick Chem.

436) SODIUM POLYMERIC CARBOXYLATE — Nopcosize D, a 10%-active, water-soluble sodium polymeric carboxylate used in warp sizing of Dacron filament and spun yarns, as adhesive in paper coating formulations. Excellent chemical stability. Nopco Chem. Co.

437) SODIUM TETRATHIONATE —  $\text{Na}_2\text{S}_4\text{O}_6$ . 98-100%. Sol: water. Mild reducer. Exp. Eastern Chem.

438) SOFTENING AGENT — Softener R for use with reactant-type resins for softening textiles. Enhances properties of fiber, is economical, easy to apply, effective with all thermosetting resins. Cationic substantive softening agent is water-soluble, supplied as 50% paste. Rohm & Haas.

439) STABILIZER — Advastab PS-38 for use where high amounts of phosphates are in a vinyl formula to obtain flame-proofness. A non-metallic complex organic, liquid imparts heat, light stability. Also a plasticizer. Advance Solvents.

440) STABILIZER — A liquid Ba stabilizer for vinyls, Advastab BA-13P is used with Advastab ZN-9, a zinc stabilizer, and E-49 for non-staining with sulfur. Advance Solvents.

441) STANNOUS CAPROATE — As a lube oil additive or curing catalyst for silicones,  $[\text{CH}_2(\text{CH}_2)_5\text{COO}]_2\text{Sn}$  has highest tin content of commercially available tin soaps. Insol: water. Sol: organics. Metal & Thermit Corp.

442) STANNOUS CATALYSTS — Group of catalysts for use with silicones for waterproofing textiles, leathers. Called SO-28, 10-N, and XTO-17, they differ in stannous content and organic radical. Advance Solvents.

443) STANNOUS OCTOATE — Use: Lube oil additive, curing catalyst for silicones. No added solvent. Insol: water, methanol. Sol: benzene, butyl carbitol, petroleum ether, silicon oils. Indefinite melting point, high boiling. Metal & Thermit Corp.

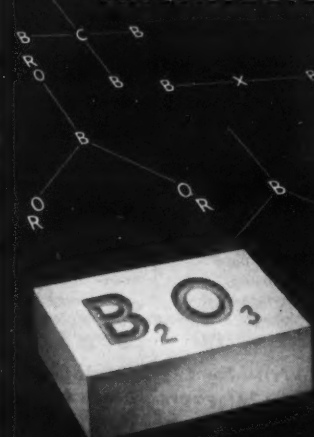
444) STANNOUS OLEATE — Used as lube oil additive and as a curing catalyst for silicones. Liquid at room temp. Solubilities similar to stannous octoate. Metal & Thermit Corp.

445) STARCH DERIVATIVES — Cato starches for warp sizing, finishing, flocculant for wet end addition on paper machine. Cationic-active. Increases paper strength, retention of fillers and pigments. National Starch.

446) STARCH DERIVATIVES — Napon starch derivatives contain both hydrophilic, hydrophobic groupings. Three viscosities. Uses: protective colloid, thickener, emulsifier for paper, textiles; tub sizing, paper coating. Exp. National Starch.

(Continued on next page)

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Whatever your plans —  
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Here's a basic raw material that's a must for chemical "architects" who can use  $\text{B}_2\text{O}_3$  for important research and development in various boron derivatives, such as boron carbide, organo-boron compounds, metallic borides or elemental boron. There's no price premium on this premium compound—so why not take advantage of its availability in commercial quantities...from one of the world's largest sources of diversified boron chemicals.

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When inquiring check CP 6136 opposite last page

## new chemical materials

nos 447 to 486

(Continued from preceding page)

447) **STEARYL DIMETHYL BENZYL AMMONIUM CHLORIDE** — Cosmetic grade. Yields highly uniform results on formulation into creme rinses for hair. Pendent CA is very slightly toxic, has chemical formula  $C_{25}H_{47}N(CH_3)_2(CH_2CH_2)_2Cl$ . Raymond Labs.

448) **STILBENE DERIVATIVES** — Blancophor HS-71 and HS-76. Optical whitening agents for cellulosic fibers. Produces brilliant white papers. Used in liquid laundering detergents, softeners. 23 parts HS-76 replaces 100 parts HS-71. Sol: water. General Aniline — Antara.

449) **STYRENE-BUTADIENE COPOLYMER PAINT LATICES** — High stability. Does not need plasticizers to form clear continuous films. Adhesion, flexibility, extensibility are excellent. Butaprene paint latices require no modification to use in many applications. Firestone Plastics Company.

450) **STYRENE COPOLYMER RESIN** — Cyclocac. Easily processed, high impact strength, high heat-distortion temp (183°F). Thermoplastic. Good electrical, low-temp properties. Oil-, chemical-resistant. Marbon Corp.

451) **STYRENE COPOLYMER RESINS** — Plio-Tuf Resins are high styrene copolymers, thermoplastic, for molding, extrusion, calendaring. Goodyear Chem.

452) **STYRENE COPOLYMER RESIN SOLUTION** — Designed as a paper coating for moisture-proof papers used in packaging. Pliolite S-7 is a styrene copolymer resin in toluene solution. Solids: 29-31%. Compatible with most paper coating ingredients. Goodyear Chem.

453) **SUCCINONITRILE** —  $NCCH_2CH_2CN$ . Purity >99%. Can be reduced to tetramethylenediamine, for polyamide, polyurethane fibers. Other uses as intermediate include plastics, resins, disinfectants, textile treating agents, rubber chemicals. Exp. BP: 267°. Monsanto.

454) **SUCCINYL CHLORIDE** —  $(CH_2COCl)_2$ . BP: 97-100° @ 30 mm. Introduces succinyl group without necessity of removing water. Semi-commercial. Arapahoe Chemical Co.

455) **SULFATED FATTY ALCOHOLS** — Used as an emulsifier for cosmetics, ointments, Ceramol (partially sulfated fatty alcohols). Non-toxic, melts at 50°C. Aceto Chem Co.

456) **SULFATED SYNTHETIC ESTER** — Softener, wetting, rewetting agent for Sanforized cotton fabrics, Warcolene A-325 provides good fiber lubrication, is free-flowing. Water soluble, purity is 42-44%. Warwick.

457) **SULFONATED ALIPHATIC POLYESTERS** — High speed, low foaming textile wetting and rewetting agents, effective in hot or cold soln. Nekal WS-21: 17-20%-active. Nekal WS-25: 55-60%-active. Sol: water. General Aniline — Antara.

458) **4-SULFOPHTHALIC ACID** —  $HO_2SC_6H_4(COOH)_2$ . Used in synthesis of phthalocyanine dyes, vat dyestuff intermediates, surface-active agents. 50% aq. soln. Carwin.

459) **SULFURIZED HYDROCARBON** — Polyrez. Imparts oil-ozone-resistance in rubber compounds. Ring and bell MP: 120°. Sol: aromatics. Insol: naphtha. Carter Bell Company.



460) **SUNPROOFING WAXES** — Prevents sun, ozone checking in natural, synthetic rubber products. Sunproofing Waxes have general formula of  $(C_{25}H_{47})_2$ . Toxicity: nil. Economical. Melt: 75-78°. Ross Co.

461) **SYNTHETIC WAX** — Petrolite Wax #R50 is a micro-crystalline wax blended with resin. Used in manufacture of polish, it avoids necessity for carrying separate stocks of wax and resin and having to blend them. Acid No.: 40-50. Saponification No.: 65-80. NPA Color: 4 1/2 (max), while penetration (100/5) is a max of 2. Toxicity: nil. Petrolite Corp.

462) **TEREPHTHALYL CHLORIDE** —  $1,4-C_6H_4(COCl)_2$ . Tech. Makes terephthalic acid derivatives. Exp. Arapahoe Chem.

463) **TERTIARY AMINE** — Ethoduomeen T/13. 88% tert-amine.  $R-N(C_2H_5)_2$ . Sol: in <50% concentrations in most organics. Combines strong cationic properties with water-dispersability. Uses: emulsifier, wetting and dispersing agent, specialized corrosion inhibitor. Armour.

464) **1,2,5,8-TETRAACETOXY-ANTHRAQUINONE** — Called tetraacetyl quinalizarin. Colorimetric reagent for Ge. Fine Organics.

465) **TETRABROMOPHENOLPHTHALEIN ETHYL ESTER** — Acid-base indicator in titrations in anhydrous organic solvents. MP: 206-209°. Dist. Prod.

466) **TETRACHLOROBENZENE MIXTURE** — As an intermediate, esp. for solvents. General formula  $C_6H_2Cl_4$ . Boils at 210-265°. Has low volatility. Dow Chem.

467) **TETRAFLUOROETHYLENE FIBER** — Teflon fiber for use to make filter fabrics, laundry textiles, packings, gaskets, roll covers, conveyors, diaphragms, thread. Offers heat, chemical resistance; low friction, wettability, adhesion; good strength, flex, abrasion characteristics. Formula:  $(C_2F_4)_n$ . Non-soluble. MP: 327°. Nontoxic below 400°F. DuPont.

468) **TETRAHYDRO PHTHALIC ANHYDRIDE** —  $C_8H_6O_3$ . 99% purity. BP: 195° @ 50 mm. (Partial conversion to low-freezing isomer occurs above 150°.) Solidifies: 99-101°. Makes plasticizers, resins, adhesives, pesticides, chemicals, additive for rubber compounding. Resins noted for light color, good color retention. National Aniline.

469) **1,2,4,5-TETRAMETHYLBENZENE** — Durene,  $(CH_3)_4C_6H_2$ , has min purity of 99.6 mol %. BP: 196.6. MP: 79.2. Intermediate for resins, dyes, biocides, fibers, plasticizers, surface-active agents, pharmaceuticals. Open positions on ring readily undergo aromatic substitution reactions. Four methyl groups undergo many reactions. Exp. Sinclair Chemicals.

470) **TEXTILE BRIGHTENERS** — Safaritone Whites WNOA and C optically brighten wool and synthetics, rayon and bleached cotton respectively. Do not need dissolving chemicals. Sterling.

471)  **$\beta,\beta'$ -THIODIPROPIONITRILE** — Selective solvent for countercurrent extraction of aromatics from aliphatics, chemical intermediate.  $(NCCH_2CH_2)_2S$ . At 3 mm, 90% boils between 181-185°. Exp. Monsanto.



472) **THIOMALIC ACID** — Shows bacteriostatic properties; reagent for Pd; potential use in pharmaceuticals, dyestuffs, resins.  $C_6H_4O_4S$  is 95% pure, boils at  $200^\circ$ , melts at  $149-150^\circ$ . Sol: polar solvents. Insol: non-polar solvents. National Aniline.

473) **THIXOTROPIC BODIED OIL** — Burnok 5040 was developed to improve outside house paints without radical change in formula. As a vehicle, it imparts thixotropy. Will not liver mineral spirits. Washburn.

474) **TITANIUM POWDER** — 99%. For research. Three grades: 100, 200, and 325 mesh. Exp. Metals Disintegrating.

475) **TITANIUM SPONGE** — Purity greater than 99%. Used in manufacture of Ti metal. Dow Chem.

476) **TITANIUM TETRACHLORIDE** —  $TiCl_4$ . Used to make Ti metal. 98% min purity. BP:  $136.4^\circ$ . Dow Chem.

477) **TITRIMETRIC INDICATOR** — For carbonate determination in water. 4,4'-Bis(2-amino-1-naphthylazo)-2,2'-stilbenedisulfonic acid disodium salt. Dist. Prod.

478) **m-TOLIDINE DIHYDROCHLORIDE** — Supplied in paste-form, having 40-60% amine content,  $[H_2N(CH_2)_3C_6H_4]_2$  is used in manufacture of dyes and pharmaceuticals. MP:  $107-108^\circ$  (free base). Sol: hot water. Carwin Co.

479) **TOLUENE** — Nitration grade. 99.9%. BP:  $110.6^\circ$ . Makes nitrotoluene, resin solvent. Derivatives used in explosives, paints, enamels. Sun Oil.

480) **TOLUENE-3,4-DITHIOL** — Reagent for tin. East-ern Chem.

481) **TOLYLENE DIISOCYANATE** — For polyurethane rubber, adhesives, resins. 98%  $CH_2C_6H_4(NCO)_2$ . Toxic. Sol: benzene. MP:  $20^\circ$  Exp. Westvaco.

482) **2,4-TOLYLENE DIISOCYANATE** — 99.5% pure  $(CH_3)_2C_6H_3(NCO)_2$ , contains <1% of 2,6-isomer. BP:  $120^\circ$  @ 10 mm. Solidifies:  $19.8^\circ$ . Intermediate for elastomers, foams, adhesives, fibers, other polymers. Exp. National Aniline.

483) **TOLYLENE DIISOCYANATES** — Mixtures of 2,4- and 2,6-isomers of  $CH_2C_6H_3(NCO)_2$ . Makes elastomers, foams, adhesives, fibers, other polymers. Introductory quantities. #7525 is 99.3% pure; has isomer ratio of 2,4/2,6 of 80/20. #7530 is 99.5% pure; 2,4/2,6 isomer ratio is 63/37. Both boil at  $118-120^\circ$  @ 10 mm. National Aniline.

484) **p-TOLYLSULFONYLMETHYLNITROSAMIDE** — A stable, inexpensive, non-skin irritating precursor of diazomethane. Formula:  $CH_2C_6H_4SO_2N(NO)CH_3$ . Purity: 98-99%. MP:  $58-60^\circ$ . Sol: ether. Aldrich Chem.

485) **TRICOSENYLSUCCINIC ACID** — 95% pure. Water repellent, corrosion inhibitor. Exp. Armour Res.

486) **TRICOSENYLSUCCINIC ANHYDRIDE** — 95%  $(C_{18}H_{31})_2C_6H_3(C_4H_2O_2)$ . Water repellent, corrosion inhib. Exp. Armour Res.

(Continued on next page)

UNLESS OTHERWISE SPECIFIED . . .

- 1) Commercial quantities are available ("Exp" indicates otherwise)
- 2) Pressures are in mm of mercury (abs.)
- 3) Boiling points are at 760 mm
- 4) Temp is in  $^\circ C$
- 5) Solubilities are at "room temp"



# SOLVAY<sup>®</sup>

## MERCURY CELL

## CAUSTIC POTASH

**FOR THE FIRST TIME!** A grade of caustic potash that sets new standards for purity—and at a **PRICE NO HIGHER THAN ORDINARY PREMIUM GRADE** low chloride material.

**SOLVAY MERCURY CELL** Caustic Potash has only trace quantities of chloride or metals, and chlorates are not detectable. This new material is produced in 2 forms: in white flakes, 90-92% and 45% liquid.

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Write today for prices, samples, technical information. SOLVAY's Technical Grade of Caustic Potash is still available in all standard forms.

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☐ Flake ☐ Liquid

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Soda Ash • Snowflake® Crystals • Potassium Carbonate • Calcium Chloride  
Sodium Bicarbonate • Ammonium Bicarbonate • Cleaning Compounds  
Caustic Potash • Sodium Nitrite • Caustic Soda • Ammonium Chloride  
Chlorine • Monochlorobenzene • Para-dichlorobenzene • Carbon Tetrachloride  
Chloroform • Ortho-dichlorobenzene • Methylene Chloride • Methyl Chloride

When inquiring check CP 6137 opposite last page

Another new development using

# B. F. Goodrich Chemical raw materials



B. F. Goodrich Chemical Company does not make this pipe. We supply only the Geon resin.

## Pipe Dreams come true with Geon Rigid Vinyl!

If you've dreamed of cutting piping costs in half, listen to this: On a major piping installation, General Electric Appliance Park changed earlier planning and used pipe made from Geon rigid vinyl... results show a fine job at much lower cost.

This corrosion resistant Geon pipe carries deionized water at 300 psi in lines 1/4" to 2". Fittings are made from Geon, too, by a new injection molding process that provides appreciably greater strength and dimensional accuracy.

Geon rigid vinyl piping costs much

less, and in many cases proves more serviceable than high grade steel and alloys. It is light in weight, saves money in installation and changeovers. It resists acids, alkalis, oil and gas... has exceptionally high impact strength.

Geon polyvinyl materials make possible many economies and improvements, point the way to increased sales and profits. Geon materials are available in many forms for use in many products—upholstery, flooring, sponge, wire and cable insulation, and a host of others. To find

how Geon can fit into your future, please write Dept. BD-2, B. F. Goodrich Chemical Company, Rose Building Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener Ontario.



GEON RESINS • GOOD-RITE PLASTICIZERS... the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

When inquiring check CP 6138 opposite last page

## Materials—Feature Section

### new chemicals — 487 to 517

(Continued from preceding page)

487) **TRICRESYL PHOSPHATE** — A type of (RO)<sub>3</sub>-PO, Kronitex K-3 is plasticizer with vinyls, most other resins. Produces non-burning film, has low extraction loss, provides greater bulking value than other types of tricresyl phosphate. BP: 257°C. Ohio-Apex of Food Mach. & Chem. Corp.

488) **TRICRESYL PHOSPHITE** — Formula: (CH<sub>3</sub>C<sub>6</sub>H<sub>4</sub>O)<sub>3</sub>P. Stabilizer in vinyls, resins, and cellulose thermoplastics. Tech. Neutral, stable. BP: 190° @ 0.11 mm. Virginia-Carolina.

489) **TRIDECYL ACRYLATE** — A comonomer for surface coating resins, pour point depressants and VI-improvers for lube oils, and textile finishes. CH<sub>3</sub>CHCOO-C<sub>13</sub>H<sub>27</sub>. BP: 150° @ 10 mm. Union Carbide and Carbon Company.

490) **TRIETHANOLAMINE HYDROCHLORIDE** — Intermediate. C<sub>6</sub>H<sub>15</sub>NO<sub>3</sub>·HCl. BP: 172-182°. Exp. Dow Chemical Co.

491) **TRIETHYL ORTHOACETATE** — CH<sub>3</sub>C(OC<sub>2</sub>H<sub>5</sub>)<sub>3</sub> has min purity of 95%, boils at 146°. Uses: pharmaceutical and photographic dye intermediate. Sol: alcohol, ether. Exp. Kay-Fries.

492) **TRIETHYL ORTHOPROPIONATE** — 99% min C<sub>2</sub>H<sub>5</sub>C(OC<sub>2</sub>H<sub>5</sub>)<sub>3</sub>. Insol: water. Sol: alcohol, ether. BP: 159°. Pharmaceutical and photographic dye intermediate. Exp. Kay-Fries.

493) **TRIETHYL PHOSPHOROTRITHIOITE** — An oxidation inhibitor in lubricating oils and an herbicide, (C<sub>2</sub>H<sub>5</sub>S)<sub>3</sub>P has high sulfur and phosphorus content, ease of oxidation. BP: 88° @ 0.2 mm. Tech. LD<sub>50</sub>: 250-500 mg/kg, single oral dose for rats. Insol: water. Sol: organics. Exp. Virginia-Carolina.

494) **TRIETHYLENE GLYCOL DIBENZOATE** — In hot melt coatings and adhesives where low moisture permeability is wanted. Benzoflex T-150 has purity: 98% min. MP: 47°C. BP: 223-237°C @ 1 mm (Hg). Sol: aromatics. Sl. sol: water, aliphatics. Exp. Tennessee Products.

495) **1,5,8-TRIHIDROXY-2-ACETOXY-ANTHRAQUINONE** — Called β-acetyl quinolizarin. Colorimetric reagent for Ge. Fine Organics.

496) **TRIISOBUTENYL SUCCINIC ANHYDRIDE** — Anti-rust additive for fuels and lubricants. Makes corrosion inhibitors, grease thickeners, plasticizers. C<sub>18</sub>H<sub>30</sub>O<sub>5</sub>. BP: 172-179° @ 5 mm. Freezes: 54°. Union Carbide and Carbon Co.

497) **TRIMETHYL PHOSPHITE** — Water-white liquid. 95+% (CH<sub>3</sub>O)<sub>3</sub>P. BP: 111°. Intermediate. Insol: water. Sol: most organics. Hydrolyzed by H<sup>+</sup>, reacts with alkyl halides; may act as alkylating agent. Exp. Monsanto Chemical Company.

498) **TRIPROPYL PHOSPHOROTRITHIOITE** — Oxidation inhibitor in lube oils, and as herbicide. Formula: (C<sub>3</sub>H<sub>7</sub>S)<sub>3</sub>P. Tech. Insol: water. Sol: organics. BP: 95° @ 0.1 mm. Single oral dose on rats, LD<sub>50</sub> is 750-1200 mg/kg. High sulfur and phosphorus content, with ease of oxidation. Exp. Virginia-Carolina.

499) **TRIS(2-CHLOROETHYL) PHOSPHITE** — Stabilizer for vinyl plastics, esterification and resins, catalyst in esterification. Compound has high chlorine and phosphorus content, high reactivity. Tech. BP: 119° @ 0.15 mm. (ClCH<sub>2</sub>CH<sub>2</sub>O)<sub>3</sub>P is insol in water, sol in organics. Virginia-Carolina.

500) **D-TRYPTOPHAN** — C<sub>11</sub>H<sub>12</sub>O<sub>2</sub>N<sub>2</sub> optically standardized for biochemical, nutritional research. Schwarz Laboratories.



501) **UNSATURATED FATTY ALCOHOLS** — Intermediates for driers, resin modifiers, quaternary ammonium compounds, lube oil additives. Form resinous materials with maleic anhydride. Makanol 8 and 9 have unsaturated alcohol content of 88% and 91% respectively, are made from soybean oil, linseed oil. Average mw are approx. 265; MP's approx. 20°. Stepan Chem.

502) **UNSYMMETRICAL DIMETHYLHYDRAZINE** — 99%  $(CH_3)_2NNH_2$ . Sol: water, alcohol, aliphatics. MP: -58°. BP: 63°. Moderately toxic. Uses: reducing agent, fuel, organic syntheses such as pharmaceuticals. Compound is easy to handle. Westvaco.

503) **URACIL-5-CARBOXYLIC ACID** —  $C_4H_4N_2O_4 \cdot H_2O$  for bacteriological studies. Sol: hot water, basic solvents. Exp. Krishell Labs.

504) **URIDINE-5'-MONOPHOSPHATE COENZYME** — Formed from uracil. 90% pure. For research purposes. Exp. Pabst Labs.

505) **VANADIUM TETRAOXIDE** — Pure  $V_2O_5$ . Sol: water. For syntheses. Exp. City Chem. Corp.

506) **VANADYL ACETATE (BASIC)** — Pure grade. Sl. sol: water, acetic acid. Exp. City Chem. Corp.

507) **VANADYL OXALATE** —  $VO_2C_2O_4$ . Tech. CP. Sol: water. Exp. City Chem. Corp.

508) **VINYL CHLORIDE COPOLYMER** — In protective coatings, Exon 470 provides good adhesion to metals, vinyl compounds, or alkyd-type surfaces. High compatibility with aromatic solvents. Firestone Plastics.

509) **VINYL CHLORIDE COPOLYMER** — Internally plasticized PVC copolymer dispersion in water, Polyco 446-L forms clear, transparent films at ordinary temp. As insulation board coating, saturant for leather, paper, textiles. Solids: 45%. Viscosity: 10-20 cps @ 25°C. pH: 4-5. Borden Co.

510) **VINYL CHLORIDE COPOLYMER EMULSION** — A 50%-Solids PVC copolymer emulsion plasticized with DOP, Polyco 568 deposits clear, flexible films that are stabilized against heat, light. Uses: Textile finishing material, non-woven fabrics, coatings. Borden Co.

511) **VINYL PLASTICIZERS** — Series combines low temp flex and low volatility for high quality vinyl plastic formulations for garden hose, wire insulation, flooring, raincoats, upholstery. Dutch Boy NL Plasticizers F-21, F-31, F-41, and A-54 are liquids. National Lead Co.

512) **VINYL STEARATE** — Vinyl ester of a commercial stearic acid for copolymerization with vinyl acetate, vinyl chloride, other monomers. General formula:  $H_2CCHOCO-R$ . BP: 180° @ 2 mm. MP: 28-30°. Sol: organics. Exp. Air Reduction Chem.

513) **VINYL TOLUENE** — Intermediate for plastics; a styrene substitute.  $C_9H_{10}$ . Toxicity: low BP: 171.0°. Dow Chem.

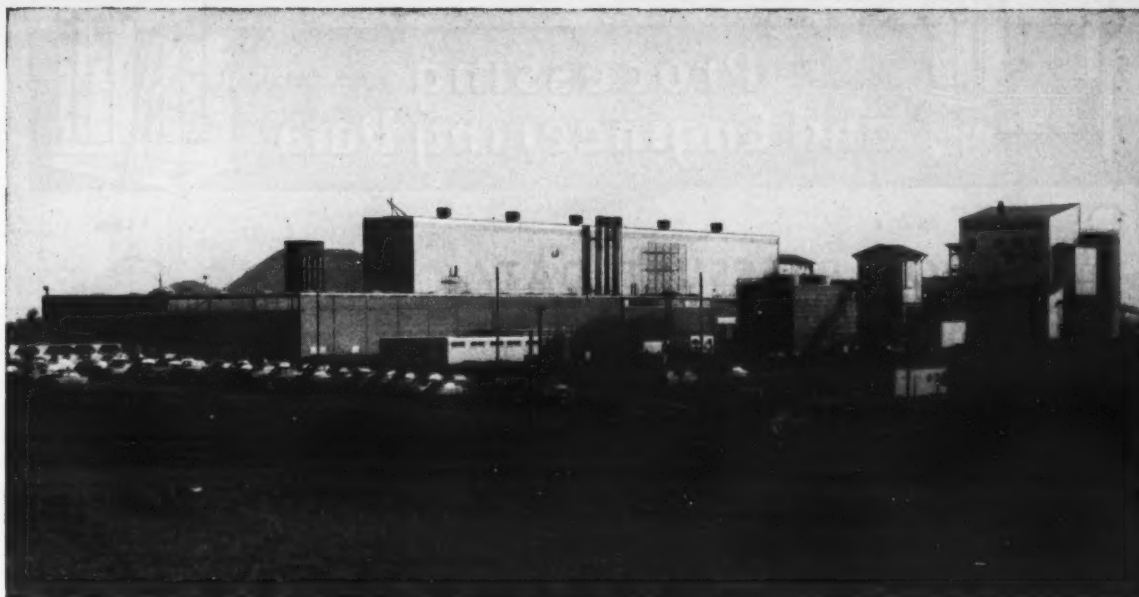
514) **VINYLTRICHLOROSILANE** —  $C_2H_5SiCl_3$  Tech. Silicone intermediate. BP: 90.5°. Toxic. Dow Corning.

515) **VINYLTRIETHOXYSILANE** — 95%  $C_2H_5Si(OC_2H_5)_3$ . Silicone intermediate. BP: 161°. Toxic. Sol: most organics. Dow Corning.

516) **WARCOLENE A-327M** — Textile lubricant and softener, esp. with aq. polyvinyl acetate emulsions. An emulsion itself, it is stable to acid conditions. Warwick.

517) **WATER LOSS CONTROL AGENT** — Filcon 212 is a high mw synthetic polyelectrolyte which is added to well drilling mud to control water loss. Sol in water: >15%. Monsanto.

(Continued on page 73)



## Lithium Putting the "prod" in production...

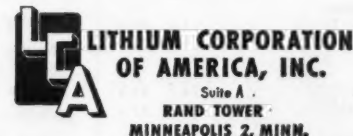
Here's a bird's-eye view of the biggest step yet in meeting industry's continuing demand for Lithium. Lithium Corporation has put on stream a lithium plant with the largest potential capacity in the world. The \$7,000,000.00 project located at Bessemer City, North Carolina is producing Lithium Carbonate and Lithium Hydroxide for industry at large.

Unique in the Lithium industry, Bessemer City is processing run-of-mine ore directly through its chemical plant, as well as concentrates. The former eliminates the once necessary step of first concentrating the ore. The plant treats company-owned deposits of spodumene ore reserves in the

adjacent King's Mountain area. The concentrates are from Canadian sources. Coupled with the company's original plant at St. Louis Park, Minnesota, a substantial increase in present productive capacity of the lithium industry is assured.

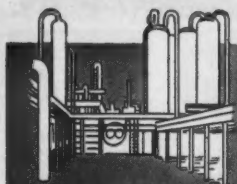
Why don't you look into Lithium? This miracle element is benefiting, cost-wise, many important industries. Organic chemicals, ceramics, air conditioning, greases, metallurgy, pharmaceuticals, brazing fluxes—all utilize Lithium to improve their products. It might well contribute untold profits for your company. A card or letter will bring you complete information.

... trends ahead in industrial applications for Lithium.

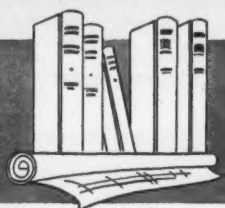


MINES: Keystone, Custer, Hill City, South Dakota • Bessemer City, North Carolina • Cat Lake, Manitoba • Amos Area, Quebec  
CHEMICAL PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minnesota

When inquiring check CP 6139 opposite last page



# Processing and Engineering Data



116a

## VAPOR PRESSURE DATA

Nomograph by **BRUCE FADER**,  
Associate Editor

Nomograph is on page 74



### Typical Example

A mixture of light paraffins is known to boil at 20°C. At what temperature will vapor pressure reach two atmospheres?

Connect 20°C and 760 mm as the known boiling condition. Locate intersection with tie-line. Pivoting, move straightedge to 1520 mm. Read temperature (approximate) as 45°C.

### LITERATURE CITED

JORDAN, "Vapor Pressure of Organic Compounds," Interscience Publishers, Inc., New York, (1954)

	X	Y		X	Y		X	Y
Acetylene	12.3	88.8	Above 50°C	19.6	42.1	Octane	22.0	38.3
Benzene			3,3-Dimethylhexane			Octacosane	32.6	4.1
Below 25°C	19.4	46.3	Below 52°C	21.6	40.9	Octadecane		
Above 25°C	18.0	46.8	Above 52°C	19.9	41.3	Below 240°C	28.0	15.3
1,2-Butadiene	14.1	59.2	Ethane	5.4	89.5	Above 240°C	27.7	15.8
1,3-Butadiene			Ethylbenzene			Pentane		
Below -80°C	15.1	65.7	Below 75°C	22.2	37.0	Below -10°C	16.6	55.2
Between -80 & -35°C	14.0	64.4	Above 75°C	21.1	37.3	Above -10°C	15.5	55.4
Above -35°C	12.6	64.7	3-Ethyltoluene			1-Pentene		
Butane			Below 45°C	24.1	33.7	Below -17°C	16.0	56.3
Below -68°C	14.8	64.3	Between 45° & 95°C	23.3	33.6	Above -17°C	15.3	56.5
Above -68°C	13.4	63.7	Above 95°C	21.9	34.0	Propane		
Butylbenzene			Ethylcyclopentane			Below -80°C	11.0	75.3
Below 60°C	24.7	30.4	Below 45°C	20.4	42.5	Above -80°C	9.4	74.5
Above 60°C	23.3	30.5	Above 45°C	19.2	42.7	Propadiene		
1-Butyne	15.0	61.0	Heptane			Below -73°C	12.0	73.0
Cumene			Below 38°C	21.3	43.0	Above -73°C	11.0	72.3
Below 40°C	23.8	34.8	Above 38°C	19.5	43.4	Propylene	8.3	75.7
Between 40° & 90°C	22.2	35.7	1,5-Hexadiene-3-yne	18.2	46.0	Styrene	21.2	36.1
Above 90°C	21.4	35.4	Hexane			Tetradecane		
Cyclobutane	14.4	60.6	Below 15°C	18.6	48.6	Below 165°C	26.9	21.6
Cyclohexene			Above 15°C	17.8	48.8	Above 165°C	25.9	22.0
Below -20°C	21.2	47.0	1-Hexene			Toluene		
Between -20 & 15°C	20.5	46.5	Below -30°C	18.8	49.5	Below 55°C	21.8	40.9
Above 15°C	18.6	46.5	Above -30°C	18.1	48.8	Above 55°C	20.0	41.7
Cyclopropane			3-Methyl-1-butene	15.1	58.9	1,2,3-Trimethylbenzene		
Below -77°C	14.0	72.9	2-Methyl-2-heptane			Below 60°C	24.2	31.3
Above -77°C	11.9	71.9	Below 68°C	22.1	38.8	Above 60°C	23.2	31.5
Decane			Above 68°C	21.3	39.0	1,2,4-Trimethylbenzene		
Below 55°C	24.1	31.6	Methylcyclohexane			Below 50°C	24.7	32.6
Above 55°C	23.2	31.8	Below 40°C	19.9	43.1	Between 50° & 100°C	23.0	32.4
1,1-Dimethylcyclohexane			Above 40°C	19.6	43.2	Above 100°C	22.8	32.6
Below 60°C	21.4	39.9	2-Methylhexane			p-Xylene		
Above 60°C	20.0	40.5	Below 35°C	20.2	44.3	Below 80°C	22.7	36.5
2,2-Dimethylhexane			Above 35°C	18.7	44.8	Above 80°C	21.2	37.1
Below 50°C	20.3	42.0						

Chemical Processing — April, 1955

## Want to forget about rust for 20 years?



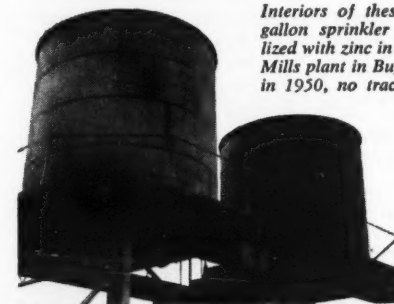
Pure zinc or aluminum, molten-sprayed on iron or steel surfaces, provides positive, dependable protection against atmospheric corrosion for upwards of 20 years without any further maintenance.

These unique coatings are *mechanically* bonded to the surface—adhesion is *not* dependent on volatile vehicles or binders. Scaling, crazing, blisters are eliminated. Protection is *positive*. "Metallize 'em and forget 'em!"

Why not find out more about how you can forget about rust on iron and steel structures and equipment—eliminate the nuisance and expense of constant painting and repainting? Write for descriptive Bulletin 62-B—it's free.

### the Metco\* Systems

—a series of 18 basic engineering specifications developed over 19 years of experience with pure zinc and aluminum coatings on many different types of structures and equipment in a wide range of corrosive conditions. The *Metco Systems* provide for standardization of surface preparation, coating thicknesses and organic aftercoatings for various surface conditions and appearance requirements.



Interiors of these two steel 15,000 gallon sprinkler tanks were metallized with zinc in 1934 at the General Mills plant in Buffalo. Last inspected in 1950, no trace of rust could be found, and zinc remaining is expected to provide protection for an additional 15 to 20 years.



### Metallizing Engineering Co., Inc.

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In Great Britain:  
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

### DON A. WATSON METALLIZING ENGINEERING CO., INC.

1143 Prospect Ave., Westbury, Long Island, N. Y.

- ☐ Please send me, without obligation, Bulletin 62-B.  
☐ Please have Metco Field Engineer call.

NAME \_\_\_\_\_  
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CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

When inquiring check CP 6140 opposite last page

CHEMICAL PROCESSING



new chemicals — 518 to 529

(Continued from page 71)

518) **WAX EMULSION** — An emulsion of wax and metal salts, Showertex is a non-durable water repellent for textiles. Does not impair cloth's quality, appearance, hand. 18% wax. General Aniline — Antara.

519) **WEED KILLER** — Telvar DW has as active ingredient 3-(3,4-dichlorophenyl)-1,1-dimethylurea,  $C_8H_8ON_2Cl_2$ . Purity: 80% min. Soil sterilant herbicide for industrial use in non-cropland areas, such as storage area. Low toxicity to warm-blooded animals. DuPont.

520) **WETTING AGENT** — Sulfonole 248M is a mixture of alkylaryl sulfonate and alkyl ether of polyethylene glycol for use as a wetting agent in textile finishing and dyeing. Supplied in 35% concentration. Warwick Chemical.

521) **WORSTED OIL** — A blended lubricant of vegetable esters with heat- and light-stable mineral oil, Nopco Worsted Oil 12-P gives efficient static control in worsted yarn lubrication. 100% active, makes stable aq. emulsions. Nopco Chem. Co.

522) **YELLOW PIGMENT** — Fast Yellow was developed for dope-dyed acetate fibers. In dispersed form, it is now available to coatings and plastics industries. Good outdoor durability, lightfastness in light tints, chemical, heat resistance. Does not fade nor blacken, bleed nor spew. Test in vehicle formulations before production runs are commenced. R-B-H Dispersions.

523) **ZINC CATALYSTS** — Pair of catalysts for application with silicones for waterproofing textiles, leathers. Called SZO-8 and SZN-800, they differ in Zn content and organic radical. Advance Solvents.

524) **ZINC FATTY ACID SOAP** — No. 26. For silk screen extender bases. Thickens without application of heat. MP: 112°. Non-toxic. 99% pure. Witco Chem.

525) **ZINCON REAGENT** — Analytical reagent for Zn, Cu. Chemically: 2-carboxy-2'-hydroxy-5'-sulfoformazyl-benzene. LaMotte Chem. Prod.

526) **ZINC STEARATE** — Finely divided, bulky white powder. Insol: water, common solvents. MP: 120-130°. Titre of fatty acid: 54° min. Iodine value of fatty acid: 4 max. Pb: <4 ppm. As: <1 ppm. Uses: making lube grease, plastics, rubber, surface coatings, cosmetics, pharmaceuticals, cement, printing inks, wax polishes and cleaners, paper coatings, pigment coatings, powder metals. American Cyanamid.

527) **ZINC STEARATE** — Lacquer grade No. 3 is 99% pure. MP: 125°. For sanding sealer lacquers. Disperses without grinding. Witco Chem.

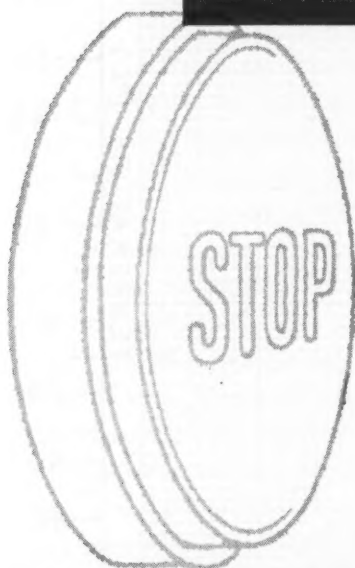
528) **ZIRCONIUM OXIDE** — Monoclinic compound has purity of 99+%. MP: >2600°. Sol: HF. Zirconium.

529) **ZIRCONIUM OXIDE** — Stabilized,  $ZrO_2$  is 100% cubic, with no crystal inversion. Used in chemical, ceramic, and electronic industries, material is 94% pure, melts >2600°. Zirconium Corp.

End of alphabetical product listing.

Use-index for all these products starts on page 80. See it first if you're after a chemical material for a specific use. It's cross-indexed with this list.

Manufacturer address list starts on page 82. Use it when writing for more information on materials which interest you.



**PUSH-BUTTON CONTROL**... simplifies handling

*Glycerine is a liquid.* There are no bags to lift, no fines. As easily as pushing a button, Glycerine can be piped into your kettles. You can measure it either by volume or by weight. And if you want, it's easy—and safe—to add more Glycerine during cooking.

Glycerine has other important advantages in making alkyds, too:

- Its simple molecular structure makes cooking easier.
- Its low MW/Hydroxyl ratio makes a wide range of resin properties economically feasible.
- Its chemistry has been thoroughly evaluated. Methods are perfected and literature abundant.

As year after year proves... *nothing takes the place of Glycerine.*

This balanced group of properties keeps **Glycerine's** usefulness growing

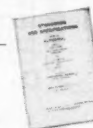
HYGROSCOPICITY • STABILITY •  
SOLVENT POWER • VISCOSITY • NONVOLATILITY •  
NONTOXICITY • TASTE • MW/HYDROXYL RATIO •

HUMECTANT •  
CARRIER • SOLVENT • LUBRICANT • SOFTENER •  
EMOLLIENT • ANTI-FREEZE • ALKYD BASE •

☒ CHECK AND SEND FOR TECHNICAL DATA



☐ 20-page booklet,  
"Glycerine Alkyds  
Tailored to Need"



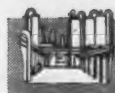
☐ 12-page booklet on  
Glycerine standards  
and specifications



☐ 16-page booklet on  
Glycerine properties  
and applications

For your free copy of any or all of these booklets write: **GLYCERINE PRODUCERS' ASSOCIATION** • 295 Madison Ave., New York 17, N. Y.

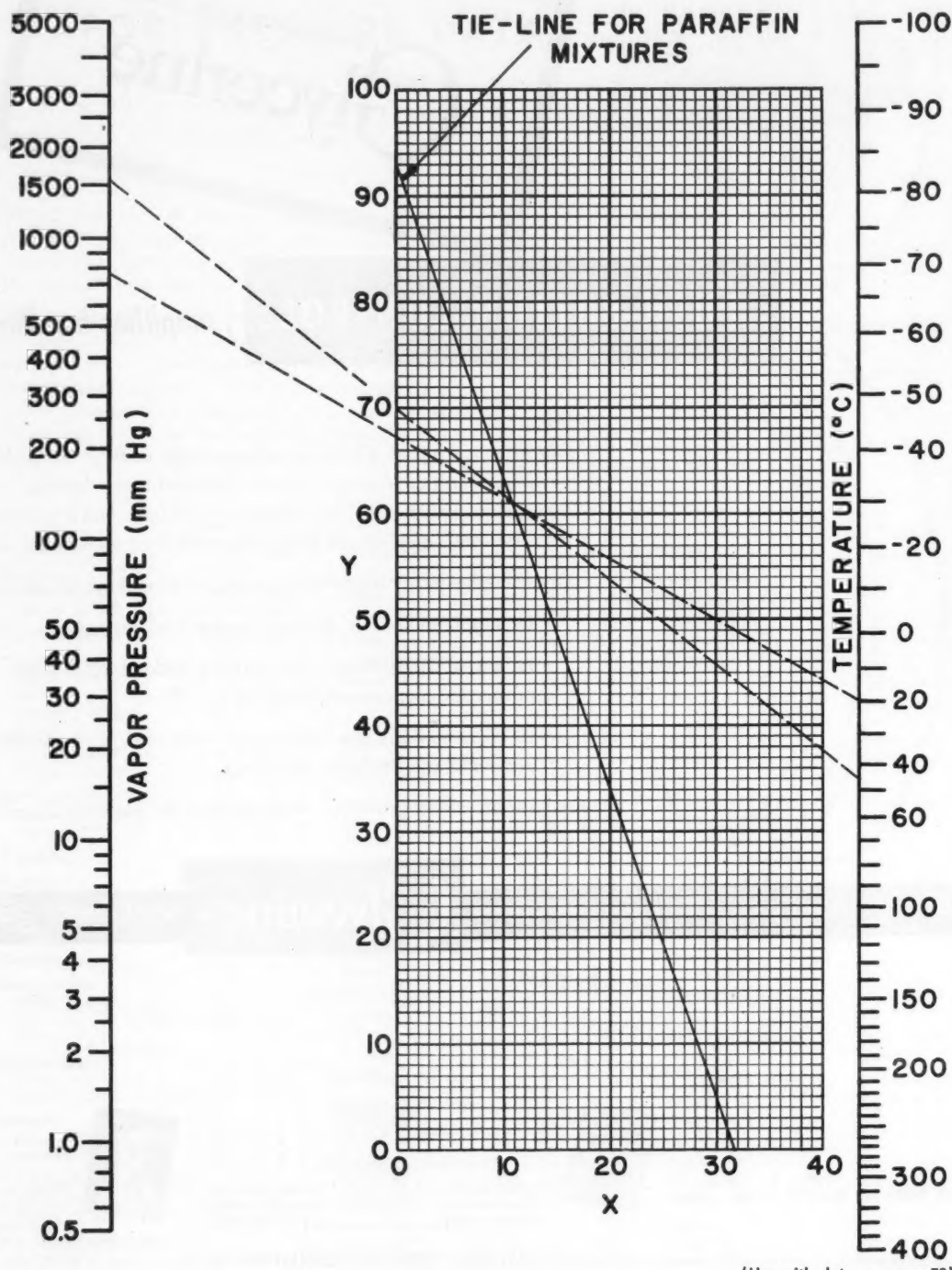
When inquiring check CP 6141 opposite last page



Processing and  
Engineering Data



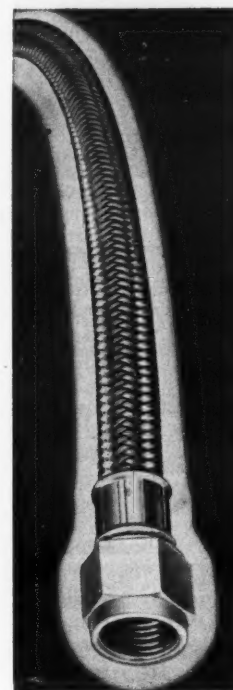
116b



(Use with data on page 72)

Look at these advantages  
of high temperature

## TEFLON® Hose Assemblies



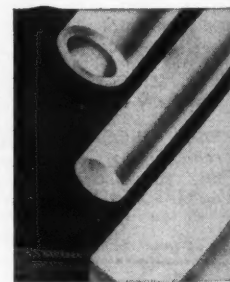
**FLUOROFLEX®-T** hose assemblies provide the advantages of Teflon in flexible hose form. More and more problems are being solved by this unique "flexible piping" which offers you:

- ▲ A chemically inert, non-swelling, non-aging Fluoroflex-T (Teflon Compound 1001) tube suitable for all fluid use.
- ▲ Vibration absorbency and flexibility that stay constant indefinitely from -100°F to +450°F.
- ▲ Corrosion resistant 304 stainless steel braid that reinforces for up to 1000 psi operation.
- ▲ Ease of handling with lightweight, space saving construction.
- ▲ Leakproof, 304 stainless fittings tightly swaged to armor and tube to prevent "blowout."

Write for Bulletin FH-1

The right grade of **TEFLON** to meet  
your chemical and mechanical needs

"Non-porous grade" Fluoroflex-T—available in rods, tubes, sheets and fabricated parts—gives you the fine quality Teflon products you need for such uses as nozzles, seals, bearings, anti-adhesive surfacing. "Mechanical grade" delivers optimum chemical properties and improved resistance to elongation. Let us quote on your requirements.



©Teflon is the DuPont registered trademark for its tetrafluoroethylene resin. Fluoroflex is the Resistoflex registered trademark for products from fluorocarbon resins.

**RESISTOFLEX**  
CORPORATION  
Belleville 9, New Jersey

When inquiring check CP 6142 opposite last page

CHEMICAL PROCESSING



**Imparts low temperature flexibility,  
plastisol viscosity stability  
to vinyl polymers . . .**

butyl decyl phthalate plasticizer has 0.98 sp gr

**Uses:** As a plasticizer in polyvinyl chloride and vinyl chloride polymers for free film or sheeting, plastisols, and extrusions.

**Features:** Compound imparts low temperature flexibility, greater plastisol viscosity stability, and slower fusion or solvent action to vinyl compounds.

**Description:** Designated Santicizer 603, the butyl decyl phthalate plasticizer is a companion product for Santicizer 160 in the primary phthalate plasticizer market. Specific gravity is 0.9806.

(Butyl decyl phthalate plasticizer is a product of Monsanto Chemical Co., Dept. CP, 12th and Delmar, St. Louis 4, Mo. . . or for more information check CP 6143 on handy form opp. last page.)

**Makes possible the synthesis  
of compounds containing  
the trimethylene group**

Trimethylene chlorobromide makes possible the synthesis of compounds containing the trimethylene group. Replacement of the more reactive bromine atom with another functional group results in formation of  $\gamma$ -trichloromethylene compounds, of interest as pharmaceutical intermediates. Chlorine atom in the chlorotrimethylene compound may, in turn, be replaced by other functional groups to yield products not obtainable by other convenient methods.

The high purity material is available in quantities up to and including carload lots.

(Trimethylene chlorobromide is a product of Michigan Chemical Corp., Dept. CP, St. Louis, Mich. . . or for more information check CP 6144 on handy form opposite last page.)

**Pigment properties**

Chemical and physical properties of VVF Pigments are presented in tabular form in eight-page brochure. Particle size distribution of siennas and umbers and of metallic browns and red iron oxides are given in individual tables. A fourth table gives tinting strength, hiding power, gloss, and fineness of the pigments. Applications are discussed.

"The Properties and Applications of VVF Pigments" is issued by C. K. Williams & Co., Dept. CP, Easton, Pa. When inquiring specify CP 6145 on handy form opposite last page.



*"Eheu, fugaces labuntur anni!"*

Today, at Dicalite, we would translate that, very broadly indeed, "Good Heavens! Twenty-five years gone by so soon!" For, as we look back to 1930 and our beginnings, we feel a double sense of wonder . . . first, that a quarter-century has sped so fast, and then, that we (and diatomite) have come so far in so short a time.

As you know, Dicalite is both our Division name and the family name of a whole host of materials processed from diatomite. This unique material, once regarded as almost an oddity, used occasionally as 'chalk-rock' building stone or in fire-lighters, today serves important uses in more than 200 industries.

This great expansion is due, in no small part, to the warm cooperation of the industries which we serve. Their laboratories have worked with ours, their product engineers and ours have together pioneered new developments, new uses, for this versatile earth.

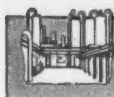
Hence, we would like to make this, our 25th milestone, an expression of thanks to the many industries throughout the world whose ready acceptance and continued use of Dicalite have made possible our growth. Their support has enabled us to advance from 1930's one deposit, one plant, to our present four deposits and four processing plants. Our obligation is cheerfully assumed and Dicalite will contribute even more greatly to industry's progress during our next quarter-century.

1930 • 1955  
**25**  
YEARS

*Dependable*  
GLC  
**Dicalite**  
DIATOMACEOUS MATERIALS

*P.S. The cryptic headline is from the Roman poet Horace (Odes II, xiv. 1).  
Its literal translation is "Alas, the fleeting years glide by,"  
but we cannot echo the poet's expression of regret.*

DICALITE DIVISION, GREAT LAKES CARBON CORPORATION, 612 SOUTH FLOWER ST., LOS ANGELES 17, CALIFORNIA  
When inquiring check CP 6146 opposite last page



## ALKYD RESIN NOMOGRAPH

By DAVID GLASER,  
Research Department General Mills, Inc.

To save time and confusion in calculating alkyd resin formulations, this nomograph finds factors for alkyds made from fatty acids, and oils and oil mixtures with various types of acids. It can also be used with excess amounts of polyhydric alcohol. Nomenclature is an extension of that given by Burrell<sup>1</sup>:

A = polyhydric alcohols	%
B = excess alcohol (based on dibasic acid or anhydride)	%
C = Water-free fraction of alcohol (95% glycerine, for example . . . C = 0.95)	—
D = dibasic acids or anhydrides	%
E <sub>a</sub> = equivalent weight of alcohol*	
E <sub>d</sub> = equivalent weight of dibasic acid*	
E <sub>m</sub> = equivalent weight of monobasic acid*	
K = 9 for dibasic acid anhydrides, 18 for dibasic acids	
L = oil plus other esters of monobasic acids	%
L <sub>m</sub> = monobasic acid esters (including resin esters)	%
L <sub>o</sub> = oil used as such	%
M = monobasic acids as such plus associated unsaponifiables	%

\*If mixtures of alcohols or acids of either class are used, weighted average of equivalent weight for that class is employed. For example, for a mixture of 20 parts technical pentaerythritol and 80 parts 70% sorbitol, weighted average equivalent weight (see Table I) would be

$$(.20 \times 36) + (.80 \times 68.6) = 62.1$$

Relation between acid or hydroxyl number and equivalent weight is given by the formula:

$$\text{EQUIVALENT WEIGHT} = \frac{56,100}{\text{ACID OR HYDROXYL NUMBER}}$$

Material balances show that:

$$D = \frac{E_d (100 - L_o - L_m)}{E_d + CE_d \left( \frac{100 + B}{100} \right) - K} \quad \text{and}$$

$$A = \frac{ME_a}{E_m} + \frac{DE_d (100 + B)}{E_d \cdot 100}$$

$$A = \frac{L_m E_a}{E_m + CE_a - 18} + \frac{(100 - L) \left( \frac{100 + B}{100} \right) E_a}{E_d + CE_d \left( \frac{100 + B}{100} \right) - K}$$

When a mixture of oil and monobasic acids are used, these equations apply. Where no monobasic acid is used as such, L<sub>m</sub> = 0 and L<sub>o</sub> = L. Where no oil is used as such, L<sub>o</sub> = 0 and L<sub>m</sub> = L.

For specific materials with equivalent weights as listed in Table I, the above equations assume values as listed in Table II. Other combinations may be calculated readily.

TABLE I  
Table of Equivalent Weights

Alcohols	
Glycerine 100%	30.7
Glycerine 98%	31.2
Glycerine 95%	32.2
Pentaerythritol 100%	34
Pentaerythritol Technical	36
Dipentaerythritol	43.5
Sorbitol 70%	68.6
Ethylene Glycol	31
Propylene Glycol	38
Diethylene Glycol	53
Trimethylolpropane	45
Methyl-α-D-glucoside	49
Trimethylololthane	40

### Monobasic Acids

Fatty Acids (Acid No. 200)	280
Tall Oil (Acid No. 170)	330
Tall Oil (Acid No. 150)	374
Rosin (Acid No. 162)	346
Benzoic Acid	122
p-T-Butyl Benzoic Acid	178

### Dibasic Acids

Phthalic Anhydride	74
Maleic Anhydride	49
Fumaric Acid	58
Succinic Acid	59
Adipic Acid	73
Azeleic Acid	94
Sebacic Acid	101
Petrex Acid	112
Citric (Tribasic) Acid	64
Tetrachlorophthalic Anhydride	143
Isophthalic and Terephthalic Acids	83
Dimer acid (Emery 1022)	285 —

Approx.

Nomograph is on page 78

## AIR POLLUTION

Air pollution can be an expensive problem in two ways: High odor levels in work areas cuts production efficiency, and outside air pollution results in bad public relations or legal claims.

Activated Carbon will help eliminate both hazards. Activated Carbon is also being used in operations requiring completely pure and sterile air, such as food manufacture and biochemical processes.

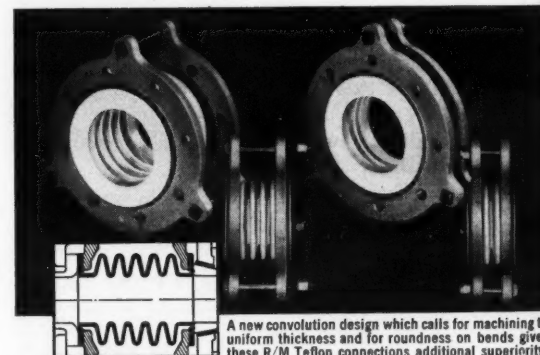
When writing, please furnish as much information about your specific needs as possible.

# BARNEBEY-CHENEY

CASSADY AT EIGHTH COLUMBUS 19, OHIO

In Canada: BARNEBEY-CHENEY LTD., St. Johns, Quebec

When inquiring check CP 6147 opposite last page



**R/M Teflon** makes chemically impervious expansion joints and flexible couplings

R/M Teflon Expansion Joints and Flexible Couplings show no reaction against chemicals; are unaffected by any known industrial acids and caustics; have no known solvent; have zero water absorption; and are unaffected by weather. The construction design diagrammed above enables them to absorb greater shock and vibration. A special tie rod arrangement prevents overexpansion of joints and bending of pipes. See your R/M distributor for full details.

\*Du Pont's trade-mark for its tetrafluoroethylene resin



## PACKINGS

RAYBESTOS-MANHATTAN, INC.

PACKING DIVISION, MANHEIM, PA.

When inquiring check CP 6148 opposite last page

CHEMICAL PROCESSING



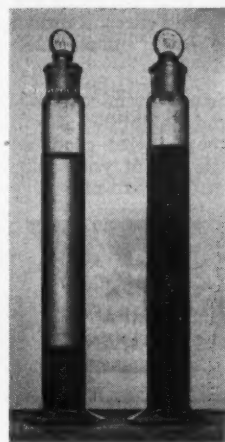
## Materials—Feature Section

**Increases overhead clarity,  
speeds up settling  
filtration rates . . .**

coagulant is effective in small dosages, and over a wide pH range

**Uses:** In the separation and filtering of water-dispersed solids.

**Features:** Its use has decreased material losses by as much as 80%. Overhead clarity in settling operations is increased as much as five times. Waste disposal problems are reduced by improved overhead clarity.

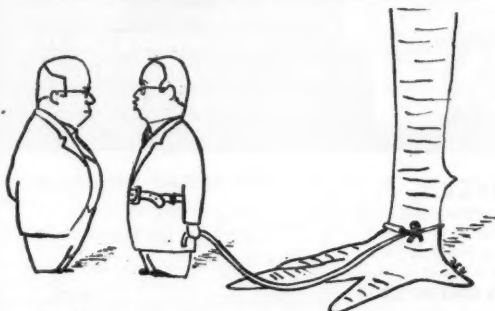


15% solids suspensions —  
Left: 30 sec after treatment  
with 0.03 lb coagulant/ton  
solids. Right: Untreated ore

Filtration rates can be increased to point where normal filter area may be reduced as much as 88%. In certain situations, total moisture content of filter cake is reduced as much as 5%.

**Description:** Separan® 2610 is effective in dosages as small as one part per two million parts of dispersed solids. It is effective over a wide pH range, and can be stored

indefinitely without need for preservatives. A synthetic, water-soluble polymer, it is manufactured as a white amorphous flake that should be dissolved and applied as a dilute aqueous solution. (Coagulant is a product of The Dow Chemical Co., 1000 Main St., Midland, Mich. . . or for more information check 6149 on handy form opposite last page.)



"I think you'll be interested in what we've done with that feed additive, A.J."



**A GOOD  
HEAD PAYS  
... IF YOU'RE  
A BREWER!**

**IT MAY COST  
IF YOU'RE  
NOT!**

## SWIFT'S DEFOAMER

**CAN HELP TAKE YOU OUT OF THE FOAM BUSINESS!**

Foam is *fun* . . . in its place. And one of its places is brimming over a cold glass. When it bubbles out of manholes, stops pumps, floats with the breezes around sewage treatment plants or takes up valuable production time, labor and space . . . then it's *trouble*, costly trouble. Care in selecting the *right* kind of defoamer is smart business, too. One of our customers, a leading manufacturer of emulsion type paints, found that he could use 1/2 as much of Swift's defoamer in his mixing and filling operations and control foam *better* than with a product he had been using. The reason? Years of research and experience with a variety of foam problems, care in manufacture, and wide selection of raw materials for the job, help us to produce defoamers that go farther because they are high in activity . . . *specialized* products developed for specific jobs. Here are a few uses:

Emulsion or Latex Paints • Fermentation Processes  
Wet Process Phosphoric Acid Production • Paper Manufacture  
If you can add *your* product to that list . . . and you're *not* a brewer, or in another industry where foam is desirable, then why not write for details on a trial order of a Swift's Defoamer? A trial will convince you and . . .

**ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS**

Oleic Acid (Red Oil) • Animal Fatty Acids • Vegetable Fatty Acids • Stearic Acids • Hydrogenated Fatty Acids • Larex (Swift's Lard Oils) • Neatex (Swift's Neat's-foot Oils) • Sperm Oils • Spermaceti U.S.P. • Monoglycerides • Sulfonated Oils • Textile Processing Oils • Anti-Foam Agents • Glycerine • Tallows • Palmex (for Steel Mills) • Hydrogenated Glycerides

**USE THIS COUPON FOR FURTHER INFORMATION**

Swift & Company, Industrial Oil Dept.  
1830 165th Street  
Hammond, Indiana

O-16

Please send data on the following products:

- ☐ Send information on Swift's Defoamers  
☐ Send 8-page bulletin on all of Swift's Industrial Oil Products

Name \_\_\_\_\_ Title \_\_\_\_\_

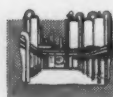
Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



When inquiring check CP 6150 opposite last page



## Alkyd Resin Nomograph

117b

TABLE II

Alkyd Dibasic Type Acid	Oil or Mono-basic Acid	Alcohol	B=Percent Excess Alcohol
1 Phthalic Anhydride	Common Drying Oils	95% Glycerine	10
2 Anhydride	Oils Drying	95% Glycerine	20
3 Anhydride	" "	Tech Pentaerythritol	10
4 Anhydride	" "	" "	20
5 Anhydride	" "	Tech PE—20% 70% Sorbitol—80%	10
6 Isophthalic Acid	" "	95% Glycerine	10
7 Phthalic Anhydride	Fatty Acid Acid No. = 200	95% Glycerine	20
8 Anhydride	Acid No. = 200	Tech PE	20
9 Anhydride	Fatty Acid—90% Acid No = 200 Benzoic Acid—10%	Tech PE	20
10 Anhydride	Drying Oil—50% Tall Oil—50% Acid No = 170	95% Glycerine	20

### Example 1

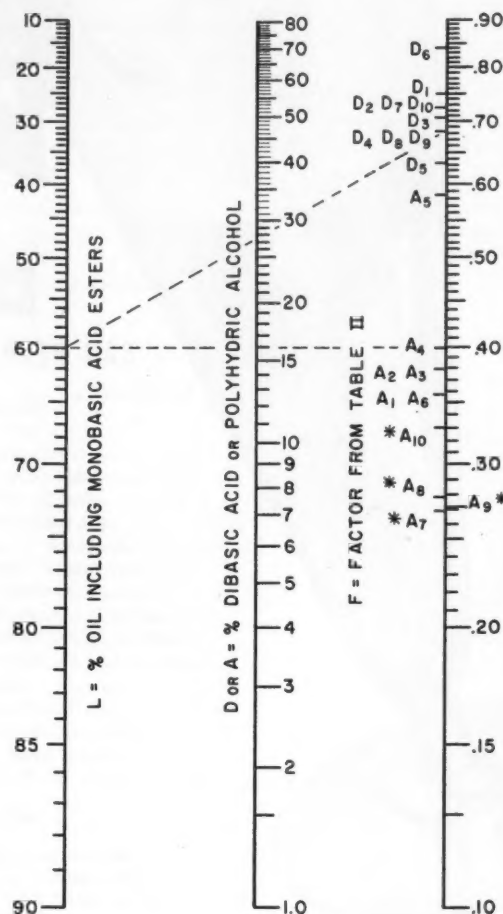
It is desired to formulate 2000 pounds of a 60% oil soya oil phthalic alkyd using 20% excess pentaerythritol. For a type 4 alkyd (Table II) at  $L = 60$ , the nomograph indicates values of  $D = 27.4$  and  $A = 16.0$ .

Checking			
100 lb	2000 lb	Deduct H <sub>2</sub> O Loss	Equivalents
$L = 60$	1200		
$D = 27.4$	548	$\times 9 = 67$	$-7.40$
		74	
$A = 16.0$	320		$+8.89$
103.4	2068	67	$1.49 = 20\%$ excess alcohol

### Example 2 (not shown)

2000 pounds of a 50% oil phthalic alkyd are to be made from a soya type fatty acid of approximately 200 acid number using 20% excess technical pentaerythritol. For this type 8 alkyd at  $L = 50$ , values of  $D = 34.2$  and  $A = 13.9 + 12.1 = 26.0$  are obtained from the nomograph.

100 lb	2000 lb	H <sub>2</sub> O Loss	Equivalents
$L = (50)$			
$M = 50 \times 280 = 47.0$	940	$\times 18 = 60$	3.36
	298	280	
$D = 34.2$	684	$\times 9 = 83$	9.24
$A = 26.0$	520	74	$-12.60$
107.2	2144		$+14.44$
		143	1.84 or 20% excess alcohol

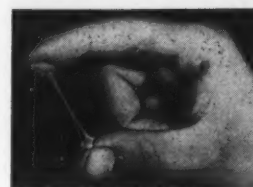


(\*) Indicates that a constant must be added to the value of "A" read on the "D" or "A" scale

Type	Constant
7	10.9
8	12.1
9	12.8
10	4.8

Nomograph to be used with page 76

## WHAT PIPE JOINT COMPOUND WOULD YOU SPECIFY TO HOLD...



PERCHLORETHYLENE,  
TOLUENE,  
"FREONS"®,  
ACETIC  
ANHYDRIDE?

Tacky enough to hold on to any type of surface

Leak Lock joint compound, with five years use in the chemical, refrigeration and aircraft industries, may be the answer to your "unsolvable" leaking joint problems.

Leak Lock has other unusual chemical properties... great adhesion and flexibility. It will resist almost everything except lower alcohols and caustic solutions. Ask us about your joint compound problems and request a sample.

*Leak Lock*

HIGHSIDE CHEMICALS COMPANY  
16 COLFAX AVENUE, CLIFTON, N. J.

When inquiring check CP 6151 opposite last page

## ...STOPS CONDENSATION DRIP

### NoDrip PREVENTS RUST — ANYONE CAN APPLY

NoDrip plastic coating is easily applied to tanks, containers, suction lines, vats, pipes, walls, ceilings, etc. NoDrip adheres to metal, concrete, brick, plastic. It forms a seamless 100% moisture-proof covering that is effective as soon as dry. Acid, alkali and brine resistant.

### FREE...

Interesting 32-page Handbook shows what NoDrip is and what it does.

SEND COUPON TODAY

SEND NoDRIP HANDBOOK

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TECHNICAL COATINGS SINCE 1895

When inquiring check CP 6152 opposite last page

CHEMICAL PROCESSING



## LAB REPORT

### Odor and Color Development in ALKYL ARYLS

#### Problem:

Prevent odor and color reversion during aging of dried alkyl aryls.

#### Solution:

Protection against odor and color degradation is achieved by the addition of Compound 19 in percentages as low as 0.03%; add Compound 19 to neutralized slurry.

**Note:** The compound is compatible with additives such as perfumes and sequestering agents.

**SINDAR** Corporation  
Industrial Aromatics and Chemicals

330 West 42nd Street, New York 36, N. Y.

Branches: Philadelphia • Boston • Cincinnati • Detroit  
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When inquiring check CP 6153 opposite last page



## What's A "New Solution"?

It's an article in **CHEMICAL PROCESSING** describing a new way of solving a tough

plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved. Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

## Materials—Feature Section

### Commercial offering of chemicals made from dextran . . .

resins, lacquers, and thickener have many possibilities

Dextran resin 523-B is a hard, clear, and light amber-colored compound which resists temperatures up to 700°F. When dissolved, it may be formulated into lacquers which can be applied by spraying, flow-coating, or dipping. They are acid- and alkali-resistant.

The benzyl ether of dextran may be formulated into a lacquer having a high drying rate. It adheres to metals without resins and plasticizers. On metal, it is substantially non-flammable when exposed to an open flame. Compatible with pigments and the major solvents, it is sprayable and adapted to flow coating and dipping. Twelve types are available for particular uses to meet customer's requirements in industrial finishes, laminations of glass, paper, and wood, and injection and compression moldings.

Carboxymethyl dextran is a high polymer molecular structure which can be made to a definite molecular weight cheaply and effectively, to give certainty of viscosity, suspensory, and dispersion powers.

Non-toxic, the white powder is dispersible in water, as little as 0.3% producing a gel. In many cases, powder can be added directly to mixture to be thickened. Dextran CMD with a mw over three million is perhaps the largest polymeric molecule which can be produced with a definite molecular composition and molecular arrangement to give a consistent, uniform product.

(Dextran resin, lacquer, and CMD are products of Midland Chemical Corp., Dept. CP, 1771 Springfield St., Dayton 3, Ohio . . . or for more information reader may simply check CP 6154 on the convenient Reader Service slip which is located opposite last page.)

### Aluminum silicate pigments in adhesive formulations

Specific case histories of use of manufacturer's aluminum silicate pigments in a corrugating adhesive formulation, in solid fiber laminated board, and as a seam adhesive for grocery bags are given in six-page folder. Penetration test results are included in the two-color bulletin.

Technical Information Bul No. 302 is issued by Edgar Div., Minerals and Chemicals Corp. of America, Dept. CP, Metuchen, N. J. When inquiring reader may simply specify CP 6155 on handy form opposite last page.

## FOAM'S a FUGITIVE



### from DOW CORNING ANTIFOAM AF EMULSION



Given a chance, a Dow Corning silicone defoamer almost always gets its man . . . restores productive capacity previously wasted on foam . . . reduces processing time . . . eliminates hazardous boil-overs . . . and at very low cost. For example:

- 12 ppm defoam cottonseed oil
- 4 ppm defoam fermenting wheat
- 4 ppm defoam neoprene latex
- 4 ppm defoam paper sizing
- .07 ppm defoam vat dies

The more easily dispersed Antifoam AF Emulsion and its parent product, Antifoam A Compound, are physiologically harmless. Effective at low concentrations against the widest variety of foamers, they pay for themselves many times over.

### see for yourself . . .

mail coupon today for

free sample

**DOW CORNING SILICONES** Dow Corning Corporation  
Midland, Mich., Dept. 3204

Please send me data and free sample of  
☐ Dow Corning Antifoam A Compound  
☐ Dow Corning Antifoam AF Emulsion

NAME \_\_\_\_\_  
 COMPANY \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

When inquiring check CP 6156 opposite last page

# chemicals "use-index"



Look here for the product use in which you're interested. The numbers refer to materials in the list starting on page 30.

Italicized numbers denote an intermediate for the use indicated.

<b>Abrasives</b>	19	<b>Dispersants (See also Pigment Dispersants)</b>	73, 114, 274, 316, 336, 337, 372, 433, 463	<b>Lubricants</b>	5, 7, 8, 43, 49, 67, 170, 223, 252, 288, 302, 303, 400, 402, 411, 516, 526
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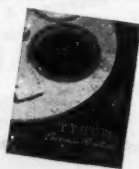


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## chemical manufacturers

Here are the names and addresses of companies whose chemical materials are described in the alphabetical listing, pages 30 through 73. Use it when writing them about their products.

Manufacturers shown have cooperated with us in preparing this listing of materials. They will be able to recognize your request immediately and give it prompt action if you will include "Dept. CP" in the address when writing them.



Aceto Chemical Co., Inc., 40-40 Lawrence St., Flushing 54, N.Y.

Acheson Colloids Company, 1635 Washington Ave., Port Huron, Mich.

Acheson Dispersed Pigments Co., 2250 E. Ontario St., Philadelphia 34, Pa.

Advance Solvents And Chemical Corp., 245 5th Ave., New York 16, N.Y.

Air Reduction Chemical Co., 60 E. 42nd St., New York 17, N.Y.

Alframine Corp., 4731-4661 E. 52nd Drive, Los Angeles 22, Calif.

The Alpha Corporation, 65 Harvard Ave., Stamford, Connecticut.

American Cyanamid Co., Industrial Chemicals Div., 30 Rockefeller Plaza, New York 20, N.Y.

American Monomer Corp., 511 Lancaster St., Leominster, Mass.

American Resinous Chemicals Corp., 103 Foster St., Peabody, Mass.

Ansul Chemical Co., Stanton St., Marinette, Wis.

Arapahoe Chemicals, Inc., 2800 Pearl St., Boulder, Colorado.

Archer-Daniels-Midland Co., 600 Roanoke Bldg., Minneapolis 2, Minn.

Armour & Co., Chemical Div., 1355 W. 31st St., Chicago 9, Ill.

Armour & Company, Research Div., Union Stock Yards, Chicago 9, Ill.

Atlantic Refining Co., 260 S. Broad St., Philadelphia 2, Pennsylvania.

The Atlas Mineral Products Co., 26 Walnut St., Mertztown, Pa.

Atlas Powder Co., 904 Market St., Wilmington 99, Delaware.

Barret Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N.Y.

Bio-Rad Laboratories, 800 Delaware St., Berkeley, California.

The Borden Co., Chemical Div., Polyco Dept., 101 Foster St., Peabody, Mass.

Brothers Chemical Company, 575 Forest Ave., Orange, N.J.

Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Massachusetts.

The Carborundum Co., Niagara Falls, N.Y.

Carolina Aniline & Extract Co., PO Box 2386, Charlotte 1, N.C.

Carter Bell Chemical Corporation, Springfield, N.J.

The Carwin Company, North Haven, Conn.

Celanese Corporation of American, Plastics Division, 180 Madison Ave., New York 16, N.Y.

Chemical Process Co., 901 Spring St., Redwood City, Calif.

Chemical Products Corp., PO Box 61, Little Falls, New Jersey.

City Chemical Corp., 132 W. 22nd St., New York 11, New York.

Climax Molybdenum Co., Inc., 500 5th Ave., New York 36, N.Y.

Columbian Carbon Co., 380 Madison Ave., New York 17, N.Y.

Commercial Solvents Corp., 260 Madison Ave., New York 16, N.Y.

Corn Products Sales Co., Chemical Div., 17 Battery Pl., New York 4, N.Y.

Coronet Phosphate Co., PO Box 29, Norfolk 1, Va.

Croda, Inc., 51 Madison Ave., New York 10, N.Y.

Dewey & Almy Chemical Company, 6050 W. 51st St., Chicago 38, Ill.

Dexter Chemical Corp., 819 Edgewater Rd., Blvd. P.O. Box 1, New York 59, N.Y.

Diamond Alkali Co., Union Commerce Bldg., Cleveland 14, Ohio.

Distillation Products Industries, Division of Eastman Kodak Co., Rochester 3, N.Y.

The Dow Chemical Company, Midland, Mich.

Dow Corning Corporation, Midland, Mich.

E. I. Du Pont De Nemours & Co., Inc., Wilmington 98, Delaware.

Eastern Chemical Corporation, 34 Spring St., Newark 4, New Jersey.

Eastman Chemical Products, Inc., Kingsport, Tenn.

El Dorado Oil Works, P.O. Box 599, Oakland 4, California.

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio.

The Emulsol Corporation, 59 E. Madison St., Chicago 3, Ill.

Ethyl Corporation, 100 Park Ave. Bldg., New York 17, New York.



Evans Chemetics, Inc., 250 E. 43rd St., New York 17, New York.

Filtrol Corporation, 727 W. 7th St., Los Angeles 17, California.

Firestone Plastics Co., P.O. Box 960, Pottstown, Pa.

Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pennsylvania.

Foote Mineral Company, 18 W. Chelton Ave., Philadelphia 44, Pa.

General Aniline & Film Corp., Antara Chemicals and Commercial Development Dept., 435 Hudson St., New York 14, N.Y.

General Biochemicals, Inc., Chagrin Falls, Ohio

General Electric Co., Chemical & Metallurgical Div., 1 Plastics Ave., Pittsfield, Mass.

General Electric Co., Chemical Division, Mechanicville Rd., Waterford, N.Y.

General Mills, Inc., 2010 Hennepin Ave., Minneapolis 13, Minnesota.

The Glidden Co., 10999 Madison Ave., Cleveland 2, Ohio

The Glidden Company, Naval Stores Div., PO Box 389, Jacksonville 1, Fla.

Glyco Products Co., Inc., 26 Court St., Brooklyn 1, New York.

B. F. Goodrich Chemical Co., Rose Building, 2060 E. Ninth St., Cleveland 15, Ohio

The Goodyear Tire and Rubber Co., Chemical Division, 1144 E. Market Street, Akron 16, Ohio

Harwick Standard Chemical Co., 60 S. Seiberling St., Akron 5, Ohio

Hooker Electrochemical Co., Buffalo Avenue at 47th St., Niagara Falls, N.Y.

Index Chemical Co., PO Box 9717, Houston 15, Tex.

Isocyanate Products, Inc., PO Box 1681, Wilmington, Delaware.

Jasonols Chemical Corporation, 825 E. 42nd St., Brooklyn 10, N.Y.

Jefferson Chemical Co., Inc., 260 Madison Ave., New York 16, N.Y.

Jones-Dabney Company, Division of Devoe & Raynolds Co., 8411 Hill Blvd., Louisville, Ky.

Kay-Fries Chemicals, Inc., 180 Madison Avenue, New York 16, N.Y.

Kelco Company, 120 Broadway, New York 5, N.Y.

Koppers Company, Inc., Koppers Bldg., Pittsburgh 19, Pennsylvania.

Krishell Laboratories, Inc., 1735 S.E. Powell Blvd., Portland 2, Ore.

Lake States Yeast Corp., Rhinelander, Wis.

La Motte Chemical Products Co., Towson 4, Md.

Manganese Chemicals Corp., 2502 Rand Tower, Minneapolis 2, Minn.

Marbon Corporation, 1926 W. 10th Ave., Gary, Ind.

Merck & Company, Inc., Rahway, N.J.

Metal & Thermit Corporation, 100 E. 42nd St., New York 17, N.Y.

Metals Disintegrating Co., Inc., Elizabeth B, N.J.

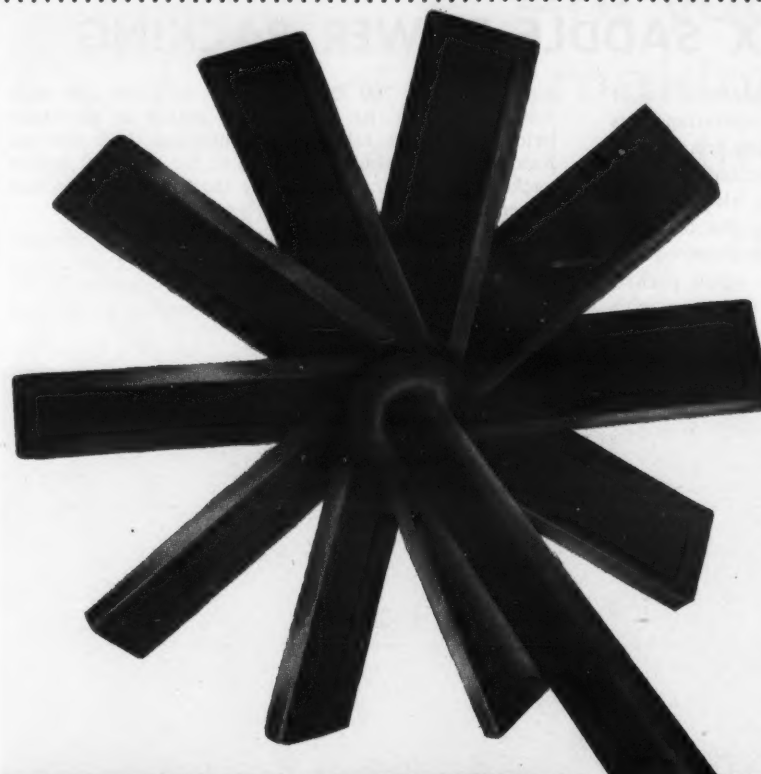
M. Michel & Co., Inc., 90 Broad St., New York 4, New York.

Michigan Chemical Corp., St. Louis, Mich.

Minnesota Mining & Manufacturing Co., 900 Fauquier Ave., St. Paul 6, Minn.

(Continued on next page)

## ✓ Industry wipes out corrosion with Firestone Exon Resins



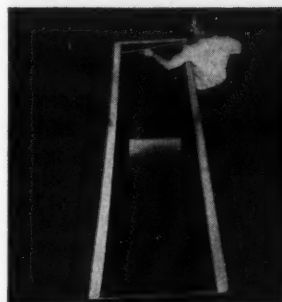
### No trouble with Agitators at the Sylvania Plant

#### SINCE VYFLEX L-10\* STOPPED CORROSION

Agitators, six feet in diameter, are employed by the Sylvania Electric Products Company to mix lime as a neutralizing agent into a mixture of sulfuric, nitric, and hydrofluoric acids. Should corrosion from this chemically active mixture cause failure, production will be slowed down due to serious problems in waste acid disposal.

Various coatings applied to the 30" blades deteriorated rapidly. Engineers from International Engineering Company and Sylvania selected VYFLEX L-10 linings 3/16" thick, for its exceptional resistance not only to corrosives but to abrasion. Wise choice. Corrosion has been stopped.

(Installation by Cor-Lin, Inc., Indianapolis, Ind.)



Losses and contamination of costly nickel-plating solutions have been eliminated at the Syntrol Company, Homer City, Pennsylvania. Large tanks are now fully protected by chemically inert VYFLEX L-10 linings.

(Installation by Castle Rubber Company, Butler, Pa.)



Chromium plating tanks at Auto City Plating Co., Detroit, Mich., are lined inside and out, including pipe outlets, with 3/32" VYFLEX L-10 for protection against highly corrosive plating solutions and splashing.

(Installation by Detroit Rubber Company, Detroit, Michigan)



At the General Electric Company's plant in Allentown, Pennsylvania, equipment such as the filter shown above, which handles corrosive and abrasive nickel-plating solutions, is lined with VYFLEX L-10.

(Installation by Electro-Chemical Engineering and Manufacturing Co., Emmaus, Pa.)

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\*Vyflex L-10 is made from Exon resins.

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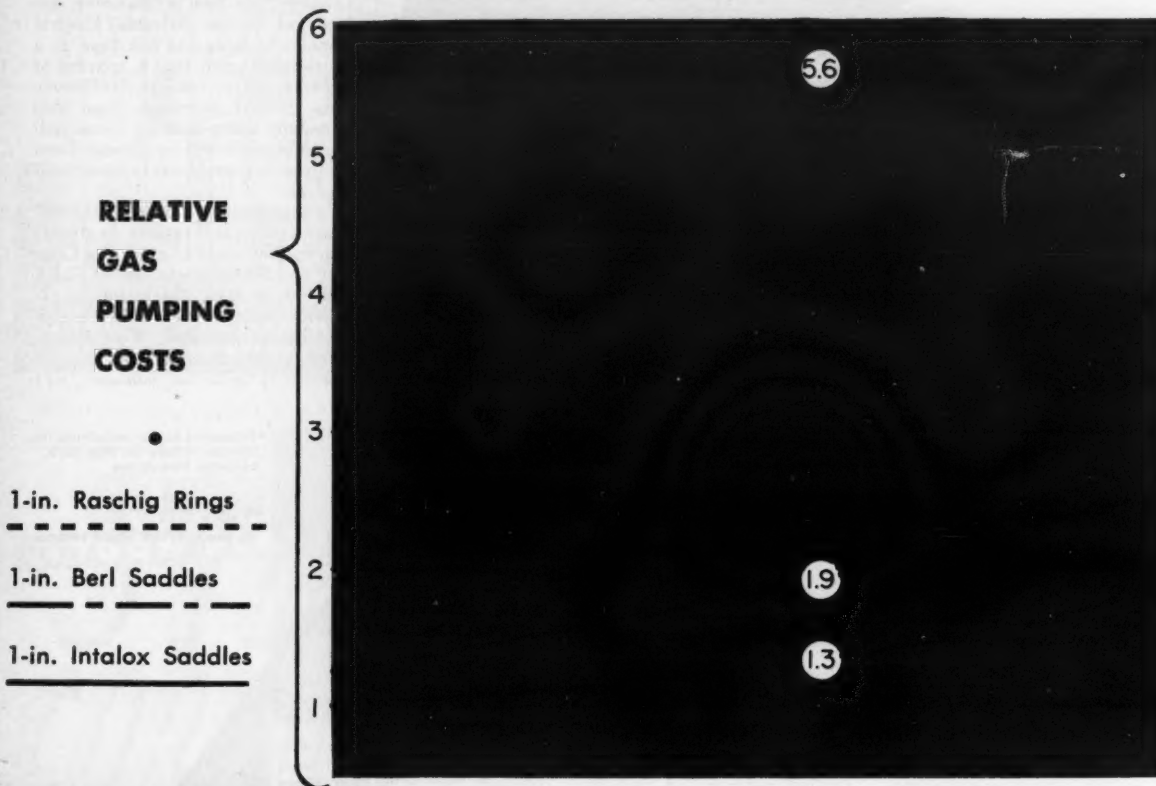
When inquiring check CP 6158 opposite last page

# HOW TO SAVE \$\$\$\$ IN GAS PUMPING COSTS WITH INTALOX SADDLE TOWER PACKING

The sharply lower pressure drop characteristics of Intalox saddles effectively reduce tower operating costs in a number of ways. Particularly striking are the savings possible in gas pumping costs. Not only can the savings in initial investment in pumps, blowers, etc., be considerably less, but operating costs, due to lower horsepower requirements, are substantially lowered. For example, if we assume three towers of equal packed height—one packed with 1" Raschig rings, one with 1" Berl saddles and one with 1" Intalox saddles—each

scrubbing, say, 700 lbs./sq. ft./hr. of inert gas with 3,500 lbs./sq. ft./hr. of liquid, a glance at the chart below shows the relative gas pumping costs for the Raschig ring packed tower is 5.6; for the Berl saddle packed tower, 1.9; and for the Intalox saddle packed tower, only 1.3.

The saving is actually even greater than it appears. The use of Intalox saddles can result in a reduction in tower height of as much as 30% in new tower design, which further reduces gas pumping costs, thus compounding the savings.



## ORIGINAL LOW PRESSURE DROPS MAINTAINED

A low initial pressure drop is of little value if the packing spalls and crumbles under normal usage. Voids quickly fill and pressure drops rise abruptly. The unique shape of Intalox results in a rigid, interlocking bed with minimum thrust on tower walls and with a minimum tendency to shift and "grind." This, plus the high inherent mechanical strength of the ceramic bodies from which Intalox is made, holds pressure drops at their original low level and keeps packing replacement costs down.

Write for a copy of Intalox Saddle Packing Bulletin IS-29.

# U. S. STONEWARE

AKRON 9, OHIO

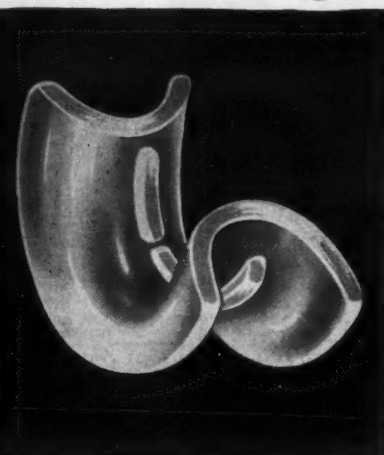
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## Materials—Feature Section

### chemical manufacturers

(Continued from preceding page)

- Monsanto Chemical Co.**, 1700 S. Second St., St. Louis 4, Missouri.
- National Aluminate Corp.**, 6216 W. 66th Pl., Chicago 38, Illinois.
- National Aniline Division, Allied Chemical & Dye Corp.**, 40 Rector St., New York 6, N.Y.
- National Distillers Products Corp.**, U. S. Industrial Chemicals Co. Div., 99 Park Avenue, New York 17, New York.
- National Lead Co.**, 111 Broadway, New York 6, N.Y.
- National Starch Products, Inc.**, 270 Madison Avenue, New York 16, N.Y.
- Ninol Labs.**, 1719 S. Clinton St., Chicago 16, Ill.
- Nopco Chemical Co.**, Harrison, N.J.
- Nuodex Products Co., Inc.**, 830 Magnolia Ave., Elizabeth, New Jersey.
- Ohio-Apex, Inc.**, Div. of Food Machinery & Chemical Corp., Nitro, W.Va.
- Oronite Chemical Co.**, 200 Bush St., San Francisco 20, California.
- Pabst Laboratories**, 1037 W. McKinley Ave., Milwaukee 3, Wis.
- Pacific Coast Borax Co.**, 100 Park Ave., New York 17, New York.
- Pacific Lumber Co., Inc.**, 100 Bush St., San Francisco 7, Calif.
- Paisley Products Inc.**, 632 W. 51st St., New York 19, New York.
- Pan American Chemicals**, 122 E. 42nd St., New York 17, New York.
- Petrolite Corporation**, Wax Division, 5515 Telegraph Rd., Los Angeles 22, Calif.
- Charles Pfizer & Co., Inc.**, Chemical Sales Div., 630 Flushing Ave., Brooklyn 6, N.Y.
- Pittsburgh Coke & Chemical Co.**, 1905 Grant Bldg., Pittsburgh 19, Pa.
- Pittsburgh Plate Glass Co.**, Columbia-Southern Chemical Corp. Sub., Fifth Ave. at Bellefield, Pittsburgh 13, Pa.
- R-B-H Dispersions**, Division of Interchemical Corp., 2 Hamilton St., Bound Brook, N.J.
- Raymond Laboratories, Inc.**, 261 E. Fifth St., St. Paul, Minn.
- Reichhold Chemicals, Inc.**, 525 N. Broadway, White Plains, N.Y.
- Reilly Tar & Chemical Corp.**, 1615 Merchants Bank Bldg., Indianapolis 4, Ind.
- Ringwood Chemical Corp.**, Ringwood, Ill.
- Rohm & Haas Co.**, 222 W. Washington Sq., Philadelphia 5, Pa.
- Rubber & Asbestos Corp.**, 225 Belleville Ave., Bloomfield, New Jersey.
- Rubber Corporation of America**, New South Road, Hicksville, N.Y.
- Schwarz Laboratories, Inc.**, 230 Washington St., Mt. Vernon, N.Y.
- Scientific Oil Compounding Co., Inc.**, 1637 S. Kilbourn Avenue, Chicago 23, Ill.
- Semet-Solvay Petrochemical Div.**, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N.Y.
- Sharples Chemicals, Inc.**, 123 S. Broad St., Philadelphia 9, Pa.
- The Sherwin-Williams Co.**, 300 W. Lake St., Chicago 6, Illinois.



When inquiring check CP 6159 opposite last page



## Materials-Feature Section

Sinclair Chemicals, Inc., 600 5th Ave., New York 20, New York.

L. Sonneborn Sons, Inc., 300 Fourth Ave., New York 10, New York.

Stapan Chemical Co., 3250 S. Kedzie Ave., Chicago 23, Illinois.

Sterling Drug Inc., 223 S. Langdon Farm Rd., Cincinnati 13, Ohio.

Sun Oil Co., 1600 Walnut St., Philadelphia 3, Pa.

Swift & Company, Adhesive Products Dept., 4115 S. Packers Ave., Chicago 9, Ill.

Swift & Company, Industrial Oils Dept., 1838 165th St., Hammond, Ind.

Tennessee Corporation, 617-29 Grant Bldg., Atlanta, Georgia.

Tennessee Products & Chemical Corp., 500-1st American National Bank Bldg., Nashville 3, Tenn.

Thiokol Chemical Corp., 780 N. Clinton Ave., Trenton 7, New Jersey.

The Trubek Laboratories, Inc., E. Rutherford, N.J.

Union Bay State Chemical Co., Inc., 491 Main St., Cambridge 42, Mass.

Union Carbide and Carbon Corp., Carbide and Carbon Chemicals Co. Div., 30 E. 42nd St., New York 17, New York.

Universal Detergents, Inc., 1825 Spring St., E., Long Beach 6, Calif.

Verona Chemical Co., 266 Verona Ave., Newark 4, New Jersey.

Versenes, Inc., 875 Waverly St., Framingham, Mass.

Victor Chemical Works, 155 N. Wacker Dr., Chicago 6, Illinois.

Warwick Chemical Corporation, 10-10 44th Ave., Long Island City 1, N.Y.

T. F. Washburn Co., 2244 N. Elston Ave., Chicago 14, Illinois.

West Virginia Pulp & Paper Co., Charleston, S.C.

Weyerhaeuser Timber Co., Special Products Branch, Tacoma Bldg., Tacoma, Wash.

Witco Chemical Co., 260 Madison Ave., New York 17, New York.

Wyandotte Chemicals Corp., Wyandotte, Mich.

Westvaco Chlor-Alkali Division, Food Machinery & Chemical Corp., 161 E. 42nd St., New York 17, New York.

Zirconium Corp. of America, Solon Center Bldg., Solon, Ohio

Here ends the Materials section, which this month is expanded to include listing of 529 chemical materials introduced as new products by 140 companies in 1954. We hope you find the information complete enough for reference, yet concise enough for quick checking. The idea of a "use-index" (pages 80 and 81) was developed to help you find your needs quickly . . . if you're after a chemical material for a specific application. The editors welcome suggestions as to how future presentations could be made more useful.



Are you still  
making Brine  
with "Model T"  
methods?

## Then Save Time and Money with THE LIXATE PROCESS

In a single piece of equipment, The Lixate Process combines a method of dissolving rock salt without agitation and a method of filtration.

### MAKES BRINE AUTOMATICALLY

The Lixator makes and filters all the brine you want or need with no human aid whatever and can be located *anywhere*—even hundreds of yards from buildings and points of use.

### UNIFORM QUALITY AND STRENGTH

The Lixator produces *only* 100% fully-saturated brine, self-filtered, crystal clear. May be accurately reduced in strength, without testing, without delays.

### PIPED TO POINTS OF USE

Turn a tap, there's your brine—where you want it, when you want it. No handling of salt or finished brine. Economy! Convenience! Efficiency! All Lixator installations are custom-engineered.

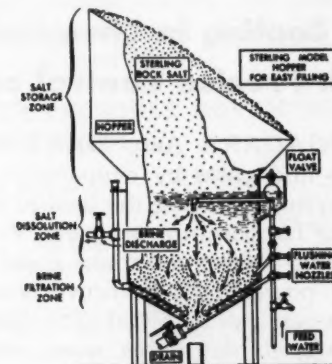
### EVAPORATED SALT DISSOLVERS, TOO

Rock Salt or Evaporated Salt—International provides both in all forms. It provides also any technical advice on salt, brine, or auxiliary equipment, required by users, for either kind of salt.

## INTERNATIONAL SALT COMPANY, Inc. Scranton, Pa.

**SALES OFFICES:** Atlanta, Ga. • Chicago, Ill. • New Orleans, La. • Baltimore, Md. • Boston, Mass. • Detroit, Mich. • St. Louis, Mo. • Newark, N. J. • Buffalo, N. Y. • New York, N. Y. • Cincinnati, O. • Cleveland, O. • Philadelphia, Pa. • Pittsburgh, Pa. • Richmond, Va.

**ENGINEERING OFFICES:** Atlanta • Buffalo • Chicago



### HOW LIXATOR WORKS

Rock Salt, fed by gravity, keeps tank filled. Water in dissolution zone dissolves salt, becomes 100% saturated brine. Lower bed of rock salt acts as filter. Result—crystal clear, fully saturated brine.

It costs nothing to find out what The Lixate Process can do in YOUR plant! SEND THIS COUPON NOW!

International Salt Co., Inc.  
Industrial Division, Scranton 2, Pa.

Without obligation, please have an International Industrial Engineer call to show me how The Lixate Process might be adapted to my plant.

Name \_\_\_\_\_ Title \_\_\_\_\_

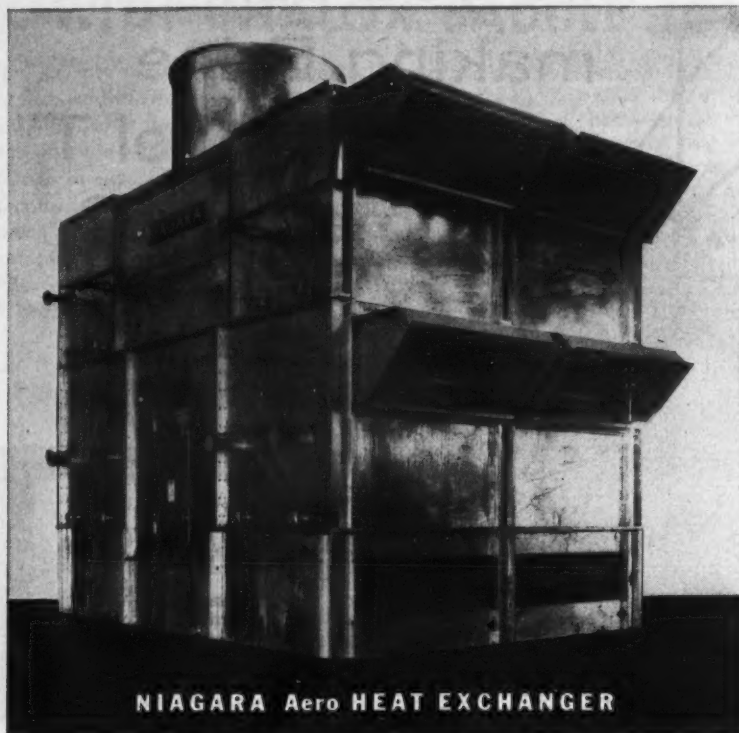
Firm Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check CP 6160 opposite last page

## Thirty Million B. T. U. CAPACITY



NIAGARA Aero HEAT EXCHANGER

### Cooling in Chemical Processes with Precise Control of Temperature

The NIAGARA Aero HEAT EXCHANGER cools liquids and gases by evaporative cooling with atmospheric air, removing the heat at the rate of input, controlling temperature precisely. You save 95% of cost of cooling water; you make great savings in pumping, piping, power; quickly recover your installation cost.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemical intermediates, coolants for mechanical, electrical and thermal processes. You obtain closed system cooling free from dirt. You solve all the problems of water availability, quality or temperature.

In CHEMICAL PROCESSES this is successfully used in cooling liquids and gases, chemical reactions, condensing distillations and reflux cooling.

Write for complete information; ask for Bulletins 120 and 124. Address Dept. CP

## NIAGARA BLOWER COMPANY

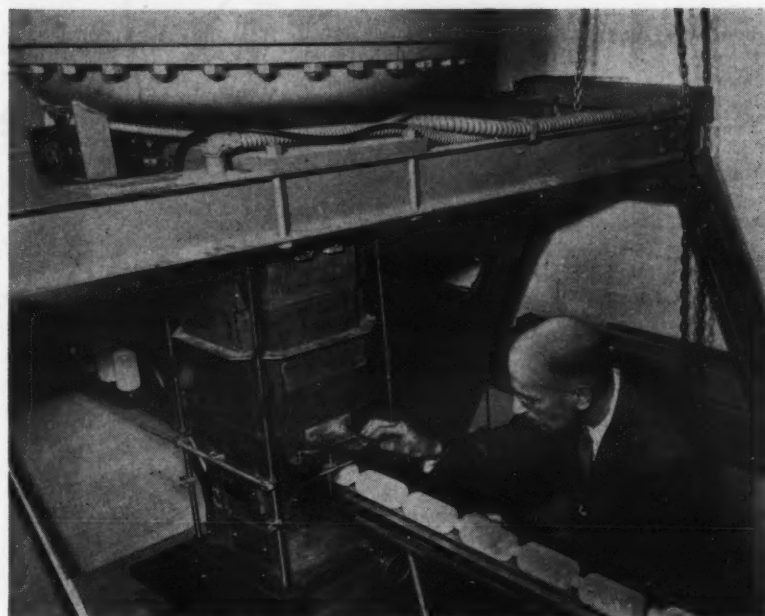
405 Lexington Ave.

New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

When inquiring check CP 6161 opposite last page

ideas — from other industries and the AEC...  
new trends in research, processes, services



Polyethylene bottles are lined up on conveyor system ready to be exposed to high-energy cathode rays

Pilot plant built around million-volt generator . . .

## bombards polyethylene with

**Treated material won't melt at 350°F, exhibits high resistance to stress-cracking**



Pilot plant built around million-volt electron generator is busy bombarding polyethylene with high-energy cathode rays . . . improving material's resistance to heat and chemicals. Outgrowth of previous experimental work (CHEMICAL PROCESSING, February 1954, page 47), the plant has been placed in operation at General Electric Company's Chemical Division, Pittsfield, Massachusetts.

Erected by the division's process development section, generator is set up to irradiate many sizes and shapes of polyethylene. "Curing" beam of electrons is produced by million-volt resonant transformer-type gen-

Just a few seconds exposure to the rays is enough to make polyethylene bottles (top) stand up under 15-minute steam sterilization

CHEMICAL PROCESSING

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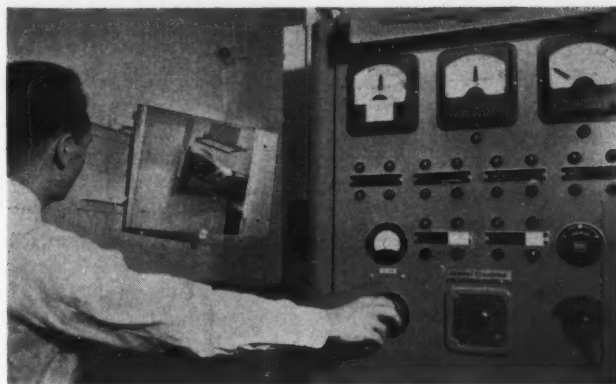
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Mirror arrangement permits operator to view process without danger of being exposed to rays



erator which shoots electrons into open air through metal window for impingement upon material being treated.

#### Cross-linking effect

Bombardment has one principal effect on polymer structure — it knocks a few hydrogen atoms out of the molecules and sets

packaging industries and is available in experimental quantities in 0.005" or 0.010" thicknesses and in widths up to 12".

Polyethylene bottles have also been irradiated experimentally. Fed past apparatus on a conveyor, just a few seconds exposure to the rays is enough to make the bottles stand up under steam sterilization. This permits wider use of these containers —

## high-energy electrons

up carbon-to-carbon bonds, or cross-links, between chains. This converts the soluble, fusible thermoplastics to an insoluble (but swellable) and infusible plastic without the addition of any chemical cross-linking or vulcanizing agent which might alter its properties.

#### Tape being made

Steadily being turned out in pilot plant quantities is GE Irrathene 101 tape. Only lightly cross-linked it has all of the properties of polyethylene, and in addition: 1) does not melt or flow under light load, at temperatures as high as 350°F; 2) exhibits high resistance to cracking under stress in soaps, detergents, acids, solvents, and other corrosive media. Its tensile strength, however, does decrease with increasing temperatures until 230°F is reached, at which point the tensile levels off at 100-200 psi. The tape is finding use in electrical and

especially for packaging and storing pharmaceuticals and biological fluids.

Concrete walls enclose the irradiation area. Operating controls are placed outside of it. Mirror arrangement permits operator to view process without being exposed to rays. Conveyor is constructed of low atomic-number material (such as aluminum) to minimize X-ray production by interaction of the electron beam with the material.

Enclosing cathode ray tube and irradiation area is a Faraday well designed to collect the electron energy; resulting current is a direct measurement of external beam current. Well is also constructed of low atomic-number material. It facilitates ventilation and removal of ozone produced by ionization of the air.

(Information on these polyethylene bottles is presented through the courtesy of Chemical Division, General Electric Company, Department CP, Pittsfield, Massachusetts.)



...including

## DUST CONTROL

Times have changed . . . so have dust control methods. The DAY Company has played an important part in modernizing the control of dust with a new concept, a new design in dust filtering. The DAY High Pressure, Reverse Jet Dust Filter manufactured under DAY and Hersey patents is a real departure from "yesterday's" type filter.

#### THE DAY "AC" FILTER PROVIDES ADVANTAGES FOUND IN NO OTHER FILTER

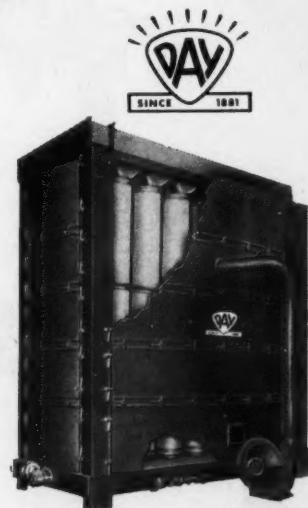
It saves valuable plant space because a smaller unit handles more dust laden air. Installation time is cut to a minimum because it is pre-assembled at the factory. The DAY "AC" High Pressure, Reverse Jet Filter brings to industry such advanced features as self-adjusting cleaning rings; square-to-round streamlined dust-laden air inlets; dust separation from different exhaust systems within one filter and multiple screw conveyor discharges. These and many more features give you the most efficient dust filtering at the lowest cost.

Leading companies have used DAY High Pressure, Reverse Jet Filtering for five years. 87% of DAY filter users have ordered additional DAY Reverse Jet Filters.

For facts about modern dust filtering—write to DAY for Bulletin 528R.

#### The DAY Company

852 Third Ave. N.E., Minneapolis 13, Minn.  
IN CANADA: P.O. Box 70Y, Fort William, Ontario  
Branch Plants: Buffalo, Fort Worth & Toronto, Ont.  
Representatives in Principal Cities



Cutaway view of the DAY Dust Filter—available housed or unhoused—for use on either vacuum or pressure. (Licensed by H. J. Hersey, Jr.)

STOP

AIR POLLUTION with DAY DUST CONTROL

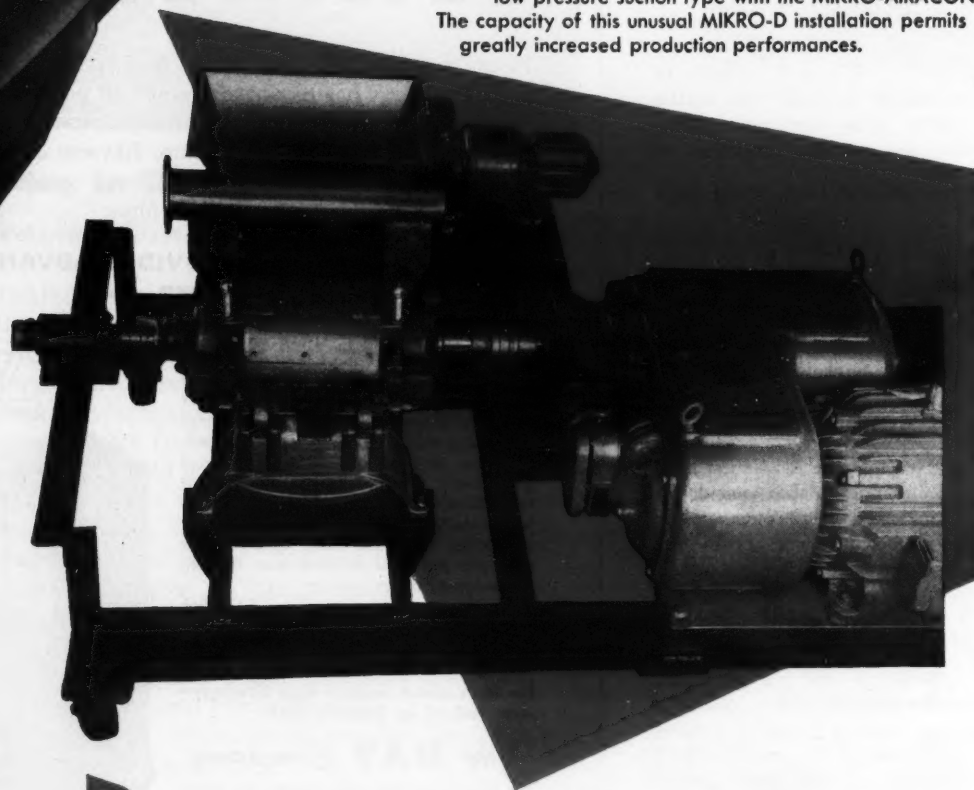
When inquiring check CP 6162 opposite last page

# MIKROS help process materials for rocket fuel

Two big MIKRO-PULVERIZERS, of the direct drive type have been installed in a large chemical plant for use in the processing of potassium perchlorate used in rocket fuel.

The significant feature of this unusual installation is the inclusion of special devices such as tachometers, for remote control in the handling of a material which is hygroscopic and highly explosive. The two units, with a capacity of 3,000 pounds per hour, are vented by MIKRO-COLLECTORS of four filter cylinder capacity.

The installation also includes air-conveying of the low pressure suction type with the MIKRO-AIRACON. The capacity of this unusual MIKRO-D installation permits greatly increased production performances.



**Mikro-D**  
PULVERIZER

SEND FOR descriptive illustrated bulletin

**PULVERIZING MACHINERY DIVISION**  
METALS DISINTEGRATING COMPANY, INC.

60 CHATHAM ROAD

SUMMIT, NEW JERSEY 3017

PULVERIZING • AIR CONVEYING • DUST COLLECTING EQUIPMENT

When inquiring check CP 6163 opposite last page

## IDEAS

### AEC increases production of iodine-131 . . .

Oak Ridge plant can make 25 curies per week of useful radioisotope

Plant for processing greater quantities of iodine-131, a radioisotope useful in medical and industrial fields, is operating at Oak Ridge, Tennessee. Costing about \$200,000, the facility has design capacity of 25 curies per week. Plant is operated for AEC by Union Carbide and Carbon Corporation.

Because of its short half-life (eight days), the isotope is impractical to stockpile, and must be in constant production. Iodine-131 is a radioactive by-product of the splitting of uranium atoms.

Plant consists of the necessary equipment for dissolving uranium slugs and separating the iodine from other fission products. Cell block is made up of six processing cells having concrete shielding walls about 30" thick.

Great demand for material is reflected by quantity and number of shipments made since isotope distribution program began. Since August 1946, 23,348 shipments have been made—with nearly 4636 of these between January and December of 1954. Total shipments represent 2541 curies. Formerly, all iodine-131 was processed in plant having capacity of only three curies per week.


(Information courtesy US Atomic Energy Commission, Dept. CP, Oak Ridge, Tennessee.)

### Organization specializes in nuclear radiation

Designed primarily to provide industry with reliable and expert information in field of nuclear radiation, newly organized company offers consulting services and issues monthly publication on subject.

Services are available on contract basis. Contracts may call for preliminary survey of potential applications, or may provide for long-range research and development program, resulting eventually in design of production facilities.

(Services are offered by Radiation Applications Incorporated, Dept. CP, 342 Madison Avenue, New York 17, N. Y. . . . or for more information about manufacturer's product, reader may simply check CP 6164 on the convenient Readers Service slip which is located opposite last page.)

For more information on product advertised at right, specify CP 6165 . . . see information request blank opposite last page. 

CHEMICAL PROCESSING



## Unruly urea toes the line

At Deere & Company's towering new \$20 million Pryor, Okla., plant, Alloyco valves police the hard-to-handle corrosives involved in producing urea.

Picking Alloyco valves for this tough job came naturally to Foster Wheeler, designer and builder of the 260-ton-per-day unit — newest urea plant completed. These valves are famous for standing up under the worst kind of corrosive and erosive conditions in scores of leading

industrial processing plants.

Alloy Steel Products Co., Inc., 1301 West Elizabeth Avenue, Linden, N.J.

5.2





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Managing Editor  
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Institute of Technology. With  
Linde Air Products, research and  
development of post-war products.



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Institute of Technology. 31 years in  
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Engineering, design and sales:  
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**RUSSELL L. PUTMAN**  
Publisher

## The men who edit Chemical Processing...

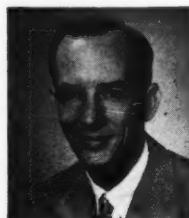
### A unique editorial philosophy guides Chemical Processing—

- ... readability of content is fully as important as the editorial content itself. *Unless an article is read, it serves no one.*
- ... to build maximum readership, *of the busy men who manage*, editors must first *take the work out of reading.*
- ... articles must be terse, to-the-point, vital, pertinent to the *job-interests* of readers, adequate in information.
- ... headlines must *inform* quickly what each article is about ... no vague or "tricky," misleading heads to waste readers' time.

From more than 30 years publishing experience, Publisher Putman designs the editorial pattern. The staff of technical editors fits the vital editorial content into this pattern.



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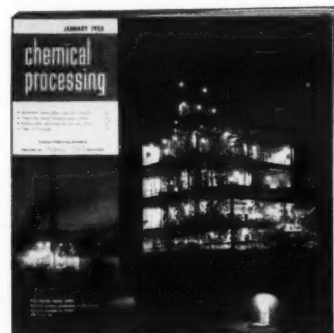
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Distilleries; research and  
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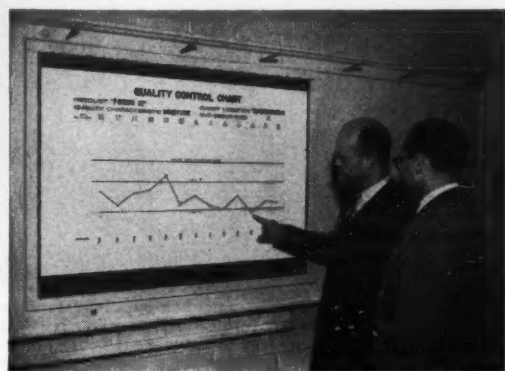


**Statistical quality control charts  
predict production troubles  
at Du Pont plants . . .**

charts based on mathematical laws of probability are accurate in 99 cases out of 100

Statistical quality control system predicts troubles before they occur at Du Pont company's "Kinetic" Chemical Division plants at Carney's Point, N. J., and East Chicago, Indiana. Used on production of Freon fluorinated hydrocarbon refrigerants and aerosol propellants, system reduces human error that creeps into quality control program based on chemical and physical analyses alone.

Although similar programs have been used successfully in other phases of industry for past 10 years or more, method has only recently begun to find wide use in the chemical field. System supple-



Typical chart used in statistical quality control. Irregular observed-data line is record of daily analysis test. If line starts climbing toward upper or lower specification limits, it's a sign of possible processing trouble

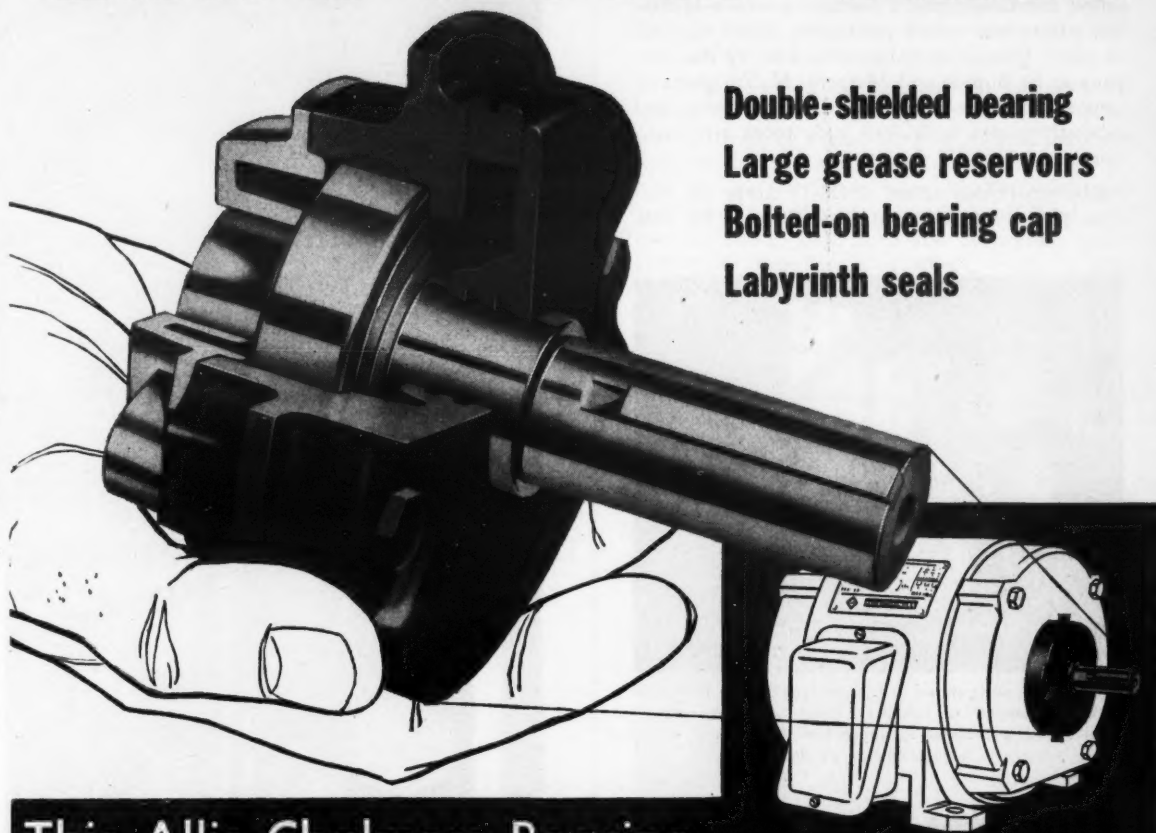
ments laboratory tests during production and, based on interpolations from periodic sampling, forecasts quality of future production. Based on mathematical laws of probability, method brings about improvement of product quality, and simplifies quality control manager's job.

Behind success of system is theory that in every production process there are a number of variables always present. At Du Pont, sets of charts reflect at a glance results of scores of daily laboratory tests, and make possible sound analysis and interpretation of these variables. Included are such tests as moisture content, non-condensable gases, boiling range, residues, halide content, and dislocation.

Charts predict accurately in 99 cases out of 100 when process is going out of control — and prediction can be made far enough ahead to ferret out cause before product falls below standards.

(Information courtesy of E. I. du Pont de Nemours and Company, Inc., Dept. CP, 6529 Nemours Building, Wilmington 98, Delaware.)

# Here Is Extra Motor Value



**Double-shielded bearing  
Large grease reservoirs  
Bolted-on bearing cap  
Labyrinth seals**

## This Allis-Chalmers Bearing Design Gives More for Your Motor Dollar

You can lubricate these bearings without dismantling motor. Pipe-tapped holes in the bearing housings at two points provide means for inserting new grease, flushing out old grease and relieving pressure during re-greasing.

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure . . . protects the grease and the

bearing against contamination from dirt and moisture.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B6210.

A-4417

# ALLIS-CHALMERS



When inquiring check CP 6166 opposite last page

**Prevent 30% production loss  
in vacuum dehydration  
by reclaiming oil . . .**

units keeps pumps operating at peak efficiency, eliminates oil change shutdowns

By installing an oil reclaimer as part of its vacuum dehydration process, Fedders-Quigan Corporation has sidestepped a bottleneck which in similar plants has caused production losses of 30% or more. Vacuum dehydration is used by the company at its Buffalo and Maspeth, N. Y., plants to remove moisture from sealed refrigeration and lube-oil systems built into each room air conditioner.

Reclaimer (Hilco model 2HM-1) keeps six vacuum pumps operating at top efficiency by con-



Dirty wet oil is stored in bottom tank (right) before being pumped to reclaimer (left). After refining, clean oil is pumped to upper tank (right) and returns to vacuum pumps by gravity flow

tinuously purifying and drying sealing oil in each pump. It passes oil through bed of Fuller's earth, filtering out solid impurities, and then removes moisture and other high-vapor-pressure contaminants by means of an electrically heated vaporizer. Oil in pumps is changed only once a year.

Continuous purification is necessary because moisture is continually being entrained in the vacuum pump oil, causing a progressive decline in pump efficiency. After three hours, if moisture were not removed from oil, pumps would lose 50% of their initial effectiveness and assembly line would have to be shut down from 15 to 20 minutes for changing of oil. This periodic delay would result in average production loss of about 7%, while production loss caused by the three hour decline in pump efficiency would average 25 percent.

Equal precautions are taken to insure that lube oil put into air conditioners is clean and dry.

## VESSELS

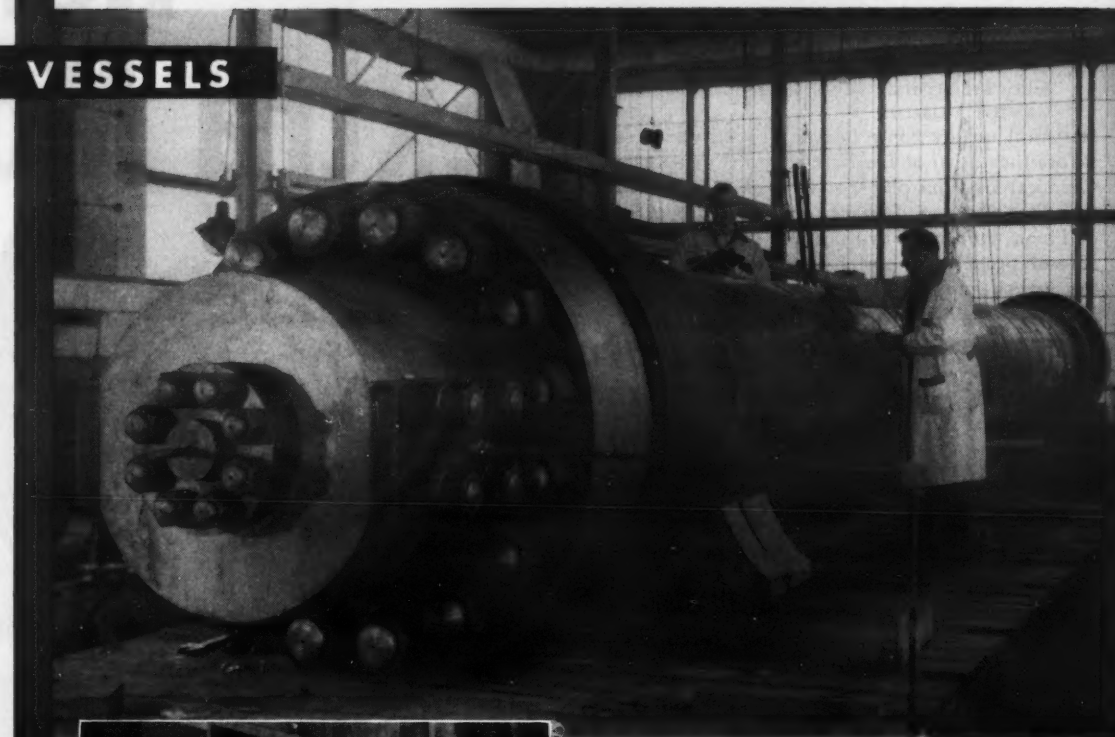
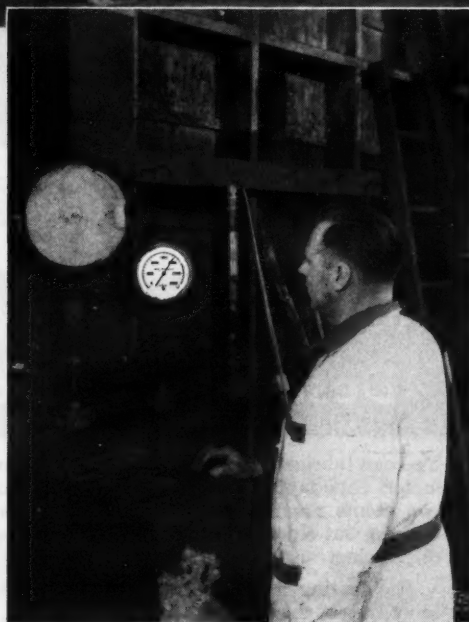


Photo shows MULTI-LAYER ammonia super-pressure converter on test at A. O. Smith. Inside vessel diameter is 25 1/8 in. . . length from one flange face to the other is 44 ft. 3 in. . . weight 238,000 lbs. Vessel is designed for operating pressures of 12,500 psi at a temperature of 450° F.



A. O. Smith technician checks gauges on converter undergoing pressure tests. The giant vessel is being tested out at 18,750 psi.

# A.O. Smith for Our

## If your process involves high DESIGN WITH

### THE ANSWER TO THE HIGHER PRESSURES WITH SAFETY

A. O. SMITH MULTI-LAYER construction offers significant advantages to the men who operate plants or design equipment for the processing industries. Today . . . right now . . . they can design for the higher pressures that will be required in the future.

In MULTI-LAYER construction, successive concentric layers of relatively thin steel plate are wrapped and welded around a central pressure-tight cylinder. There's no limitation of size or weight . . . no restrictions imposed by ingot size or forming techniques. The variations are endless.

Positive safety under pressure, too! By testing to destruction full-scale vessels at pressures in excess of

Here's a MULTI-LAYER wall operating pr

pressure

40,000 psi

vessels built

Pick the

MULTI-LAYER

cylinder of

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be fabricat

sure loads.

Let A. O.

adapt MU

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# Outstanding Advantages

## EXCHANGERS



Here's a Multi-LAYER recycle heat exchanger undergoing test pressure of 7,920 psi. Inside diameter is 17 in. . . . MULTI-LAYER wall thickness is  $3\frac{3}{8}$  in. . . . overall length 29 ft. 2 in. Weighing 31,200 lbs., this exchanger is designed for shell-side operating pressures of 5,280 psi.

## pressures, high temperatures or corrosive materials, WITH MULTI-LAYER

40,000 psi, A. O. Smith has proved that MULTI-LAYER vessels burst without fragmentation.

Pick the alloy lining required to fit your needs! MULTI-LAYER vessels can be fabricated with inner cylinder of lined or clad plate, alloy steel or non-ferrous materials. The outer layers of the vessel can then be fabricated of high strength steel to resist the pressure loads.

Let A. O. Smith engineering and research help you adapt MULTI-LAYER vessels and heat exchangers to your operation.

Write for free bulletins: "MULTI-LAYER Manufacturing and Assembling" . . . "MULTI-LAYER Engineering for Safety."

For glass-lined process equipment, contact GLASCOTE PRODUCTS, INC., Cleveland 17, Ohio — A new A. O. Smith Subsidiary

Through research



. . . a better way

# A.O. Smith

CORPORATION

PROCESS EQUIPMENT DIVISION  
International Division: Milwaukee 1, Wis.  
MILWAUKEE • HOUSTON • LOS ANGELES

When inquiring check CP 6167 opposite last page

## IDEAS

Another reclaimer (Hilco model 50x) is used to purify new lubricant before it is inserted under pressure into each unit's sealed compressor system.

Oil is put into each compressor immediately after second dehydration step, when unit has been completely dried out. Oil is drawn from 400-gal storage tank, pumped through a cellulose-packed filter, and then sent to an electrically-heated vaporizer. Moisture is drawn off as vapor passes through water-cooled condenser, and is deposited in distillate tank, leaving oil clean and dry.

Treated oil is pumped through heat exchanger to storage tank, where a 5-gpm pump sends it at a pressure of about 60 psi to charging station. Each dehydrated unit is charged with correct amount of lube oil and refrigerant at same time, refrigerant entering as liquid at pressure of about 175 psi and 120°F. Both lube and refrigerant enter compressor together, after which system is permanently and hermetically sealed.

(Hilco oil reclaimers are product of The Hilliard Corporation, Dept. CP, 58 W. Fourth Street, Elmira, N. Y. . . . or for more information check CP 6168 on handy form opposite last page.)



Electromagnetic vibration laboratory is set up to run vibration analysis on both military and commercial products. Large console (background) is 10-kw amplifier suitable for use with sine or complex wave functions over frequency range of 5 to greater than 3000 cycles per second. Driving motor (in foreground) weighs almost two tons and is capable of delivering 3000 pounds thrust. Oscillator is used as function generator to operate vibration motor over frequencies and amplitudes as required.

(Vibration analysis is conducted by Wyle Research Corporation, Dept. CP, 130 Maryland Street, El Segundo, California.)

Are you paying for QUALITY?  
Are you getting QUALITY?

# CAMCO

THE QUALITY LINE IN STAINLESS STEEL FITTINGS



When you specify CAMCO on your stainless steel fitting requirements you are specifying QUALITY — without paying a premium. These fittings are priced in line with competition. How do we do it? CAMCO concentrates ALL of its facilities, efforts and thinking to the manufacture of stainless steel fittings only. The resulting economies are translated into quality and passed on to you.

**FLANGES:** Manufactured to both the ASA and MSS standards covering stainless steel flanges. All flanges to ASA specifications are DROP FORGED and are permanently marked with size, pressure rating, material identification, trademark, and heat numbers — (the key to certificates of analysis and corrosion coupons when required). All flanges to MSS standards are machined from DROP FORGINGS to 4" IPS, (Weldneck flanges to 1" IPS only) and from sound castings in sizes 5" IPS and higher.

**SCREWED FITTINGS:** All ells and tees to 3/4" IPS inclusive and all cylindrical fittings to 2" IPS inclusive (caps, couplings, plugs, bushings and unions) are manufactured from DROP FORGINGS in our 150 lb. line of fittings. Independent outside tests have indicated that these fittings can be rated 1000 lb. CWP. Fittings in higher sizes of our 150 lb. line are machined from sound castings.

**AVAILABILITY:** Sold and stocked by distributors throughout the country and backed by large stocks at the plant for requirements in excess of normal.

Use attached coupon for Flange Dimensional Slide Rule and Catalog covering complete line.

**MAIL TODAY**

CAMCO Products, Inc., 445 State Street, North Haven, Conn.

Gentlemen:

- ☐ Please send Flange Dimensional Slide Rule. CP
- ☐ Catalog #653 covering complete line.
- ☐ Furnish address of area distributor.
- ☐ Put us on your mailing list to receive your stock list.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City and State \_\_\_\_\_



445 STATE STREET  
PRODUCTS, INC. NORTH HAVEN, CONN.

When inquiring check CP 6169 opposite last page

## IDEAS

### Offer French process for manufacturing fatty alcohols

Sinnova's process for continuous production of fatty alcohols by high-pressure hydrogenation is being offered for use in US. Process consists of the continuous introduction of fatty acids (from tallow or vegetable oils) into a tower-design reaction chamber. Nickel-chromium catalyst is employed.

Crude product is refined by continuous fractional distillation. Hydrogen and catalyst are both recovered.

Three plants are operating in France—showing that process is commercially proved.

(Fatty alcohol process is available in US through The Rust Engineering Company, Dept. CP, Rust Building, Pittsburgh 19, Pa. Check CP 6170 opposite last page.)

### Canadians study process for making essential oils from waste tree needles

Efforts to obtain commercial quantities of essential oils from spruce and balsam needles are being made at Heron Bay, Ontario. If successful, it is estimated that 5 million pounds of oil per year can be produced from needles being discarded as waste in Ontario alone.

Key to process is reported to be method of distillation. Preliminary results indicate that spruce and balsam needles will yield one per cent of their weight in oil. Old methods of obtaining the oil have been crude and inefficient, and involved filling a still with whole branches.

If process proves feasible, next problem will be to discover commercial uses for such large quantities of oil by-product.

(Essential oil research is being conducted at Ontario Paper Company, Ltd., a subsidiary of The Chicago Tribune, Dept. CP, Heron Bay, Ontario.)

## DOESN'T MAKE STEAM!

What makes steam? Only one thing: the application of heat to water. And the more efficiently this is done, the less heat-transfer surface is needed.

Two factors make heat-transfer efficient: (1) maximum temperature differential; (2) ever-changing contact with the heat-transfer surface to prevent stratification and resultant insulating effect. It's as simple as that!

### MORE STEAM IN LESS SPACE

Because Modulatic Steam Generators fully meet these two requirements, they need less than 1/5 the heating area of conventional boilers. Fuel and air are brought together under pressure, turbulently mixed and burned. Heat release is 10 to 20 times greater, per unit of volume, than found in the usual firebox. The Modulatic fire is hot.

Built-in forced draft creates a high-velocity cross-flow of all the turbulent hot gases among and around closely spaced and staggered heating tubes. This, plus Modulatic's counter-flow of turbulent water, gives up to 400% improvement in effective heat-transfer compared with conventional boilers.

### HIGH HEAT ABSORPTION

The Modulatic does not depend upon natural circulation. Water is forced from the outer coil inward to the radiant center bank. Thus, it is coolest where surrounding hot gases are coolest—hottest where heat is greatest—to maintain the maximum differential needed for most effective heat absorption. And the whole job is done more simply and easily with fewer joints and parts, less expansion.



Here's the world's most compact power package. The 160 h.p. Modulatic takes no more space than a watchman's cot. Vapor steam generators of this same type have been standard equipment for 23 years for heating Diesel Streamliners. Automatic operation. Gas, oil, or combination-fired. Pressure, 5 to 575 psi. ASME Code and UL approval. Over 10,000 in use. Ask for Bulletin 586, it tells the whole story of the many Modulatic advantages for industrial heating, power, processing. There's nothing like Modulatic!

## VAPOR HEATING CORPORATION

80 E. Jackson Blvd., Chicago 4, Illinois  
In Canada: Vapor Car Heating Co. of Canada, Ltd., 65 Dalhousie St., Montreal 3

When inquiring check CP 6171 opposite last page

CHEMICAL PROCESSING

Jet co...  
boost...  
for p...

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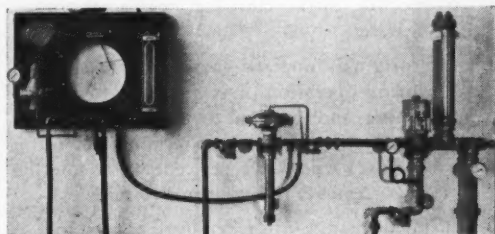
(Conti...  
Oliver...  
Compan...  
Illinois...



**Jet cooking process for starch  
boosts wet end addition  
for papermaking**

Development of a continuous jet cooking system has increased the importance of wet end addition of cooked starch in papermaking. Known as Staley's jet cooking system, it provides a speedy and accurately controlled method for starch cooking and is reported to make new range of starch properties.

The system, in brief, involves shock-heating and shock-cooling in rapid succession, with accurate control of cooking temperature. Starch slurry combines with a high-velocity jet of steam, causing



Compact continuous jet cooking system for starch is designed so that components can be separately located. Slurry preparation tank completes system

violent agitation, instant condensation of steam, and rapid heat transfer. Complete cook can be obtained as quickly as flow in pipes to and from jet will permit. When heat supply is controlled to amount less than that required for a complete cook, a partially cooked paste of high internal uniformity is obtained.

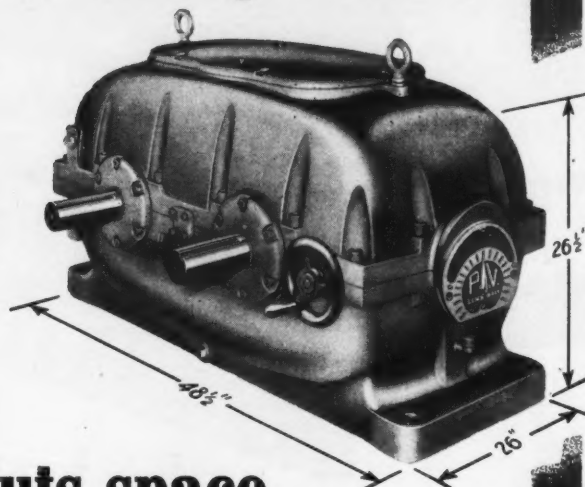
System consists of four component groups: 1) slurry preparation, 2) control panel, 3) water regulator, and 4) jet cooker. Each component may be located in different location, wherever most convenient. Control is simple. Paste quality is determined by setting temperature regulator. Quantity is measured by rotameter. Pressure regulator maintains even flow. Temperature control under normal conditions is within two degrees.

Two sizes of commercial units are available. These have maximum cooking capacities of 300 and 1200 pounds of starch per hour, at concentrations not exceeding 1/2 pound per hour.

Several experimental models have been in use for over a year. Some of the results reported are as follows: on highly loaded sheets, same total filler can be obtained, with 25% less starch than in previous cooking methods. On index stock containing 25% rag, Mullen increase of 20% is obtained compared with beater starch addition of like amount.

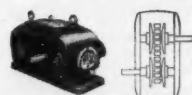
(Continuous jet cooking system was designed by Oliver R. Etheridge, A. E. Staley Manufacturing Company, Dept. CP, 22nd Street, Decatur 60, Illinois . . . or check CP 6172 opposite last page.)

**LINK-BELT  
25-hp P.I.V.  
Variable Speed Drive**

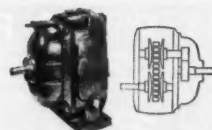


**cuts space  
requirements up to  
50%**

4 OF 16 P.I.V. TYPES  
HORIZONTAL OR VERTICAL MOUNTINGS  
1/2 TO 25 HP—  
RATIOS TO 6:1



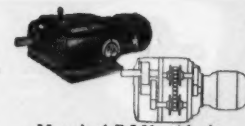
Basic, Positive, Infinitely Variable (P.I.V.) Speed Drive.



P.I.V. with single reduction input or output helical gears.



Motorized P.I.V. with single reduction input and output helical gears.



Motorized P.I.V. with single reduction input and double reduction output helical gears.

**LINK-BELT gives you all  
the advantages of positive,  
stepless speed changing  
in high horsepowers, too**

ONE of the great advantages of P.I.V.'s positive, all-metal drive is dramatically illustrated by the Size 6. Compared to other speed changers in this hp range, it saves 70 cu. ft. of space!

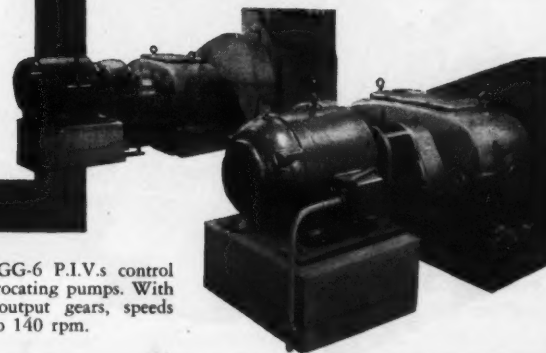
In addition, infinitely stepless regulation means you can select the exact speed you want—from maximum to minimum. Unaffected by temperature and atmospheric conditions, all moving parts are totally enclosed and splash-lubricated.

The Size 6 P.I.V. is built in three types: The basic drive . . . with input or output gears . . . with input and output gears. All are available in a wide range of ratios, 20 to 25 hp.

Get the facts on the Size 6 from your nearest Link-Belt office or distributor. You'll receive a copy of Folder 2374. And for information on the complete P.I.V. line, ask for Book 2274.

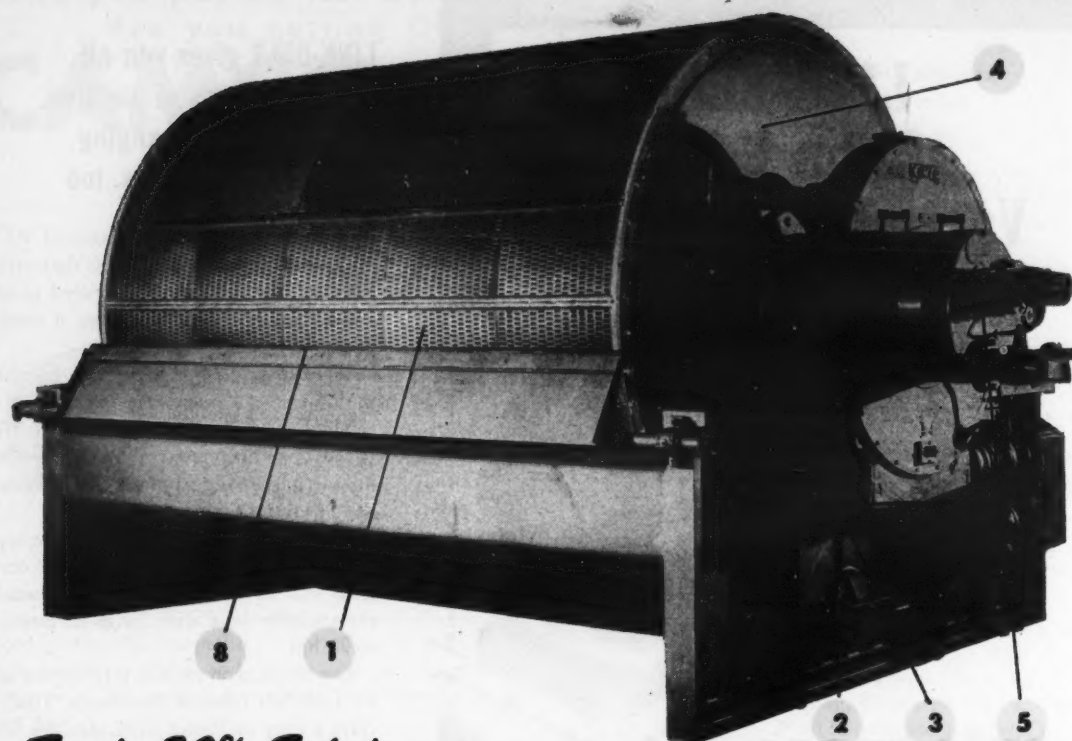


LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.



Two Link-Belt HGG-6 P.I.V.s control the speed of reciprocating pumps. With both input and output gears, speeds range from 46.5 to 140 rpm.

When inquiring check CP 6173 opposite last page

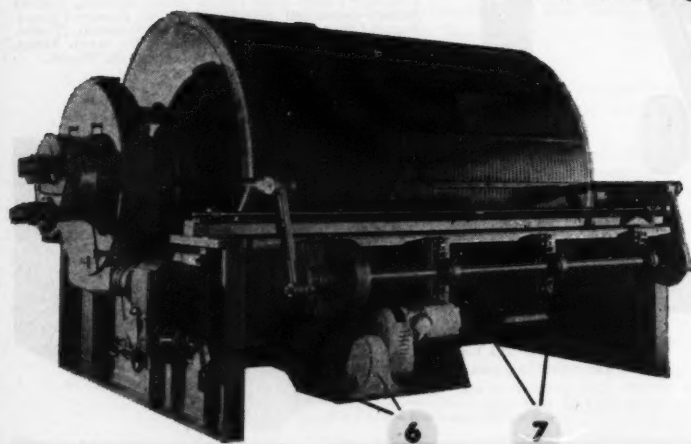


**Feeds 20% Solids--  
Cake 89% Solids**

This filter, a standard drum continuous vacuum filter design with most advanced features adapted for the customer's problem, incorporates such items as (1) rubber grids of thermo plastic type, (2) easy access through quick opening tank covers, (3) counterweighted pin type agitators, (4) steel drum-heads mastic coated, snap blow, rubber base plastic piping, (5) marine bronze valve and wear plate, (6) variable speed drives on drum and agitator, (7) anti-friction bearings on agitator shaft.

In operation a dutch weave wire cloth is caulked in the grooves and the snap blow lifts the cake from the panel away from the drum surface so that the (8) rubber tipped blade never touches the drum.

All Eimco filters are engineered and designed with the idea of prolonging cover or bag life. Eimco engineers will consult with you in the selection of the correct media for best filtration and longest life and supply you with samples of Eimco media for your own laboratory work or will advise you on shipment of samples to Eimco Research Center for free filtration analysis.





**THE EIMCO CORPORATION**  
 Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City  
 New York, N.Y. Chicago, Ill. San Francisco, Calif. El Paso, Texas Birmingham, Ala. Duluth, Minn. Kellogg, Minn. London, Eng. Paris, France Milan, Italy

**You Can't Beat An Eimco**

When inquiring check CP 6174 opposite last page

## IDEAS

**Once considered scrap after firing, aluminum rocket tubes now can be cleaned for reuse**

Reports resulting from experimental work indicate that aluminum rocket tubes can be cleaned and reused after firing rockets or guided missiles. Residue remaining in tube after firing is such that cleaning was formerly considered impractical. Tubes were classified as scrap after firing a single rocket or missile.

Cleaning process consists of placing tubes in baskets and immersing them in tank filled with chemical solution, Avasol 334. About 200 tubes can be cleaned simultaneously in approximately 15 to 20 minutes. After cleaning, tubes are rinsed with hot water.

If tube's original anodized coating has been damaged by firing operation, it is necessary to remove original layer and re-anodize the tube. In this case, tubes are transferred to a second tank (after hot water rinse) where five per cent water solution of Avasol 20 removes the layer in five minutes.

Dimensional change after removal of residues is zero. If anodized layer has to be removed and tube re-anodized, dimensional change is about 0.00005 inch per surface, or 0.0001 inch in wall thickness, which still makes tube acceptable.

New tubes cost Government about \$2.00 before coating and anodizing. Cleaning costs only about 80c — a saving of \$1.20 per tube. Savings are considerable, since tubes can be reprocessed.

(Avasol cleaning solutions are product of Alframine Corporation, Dept. CP, 4731 E. 52nd Drive, Los Angeles 22, California . . . or for more information check CP 6175 opposite last page.)

### **Booklet describes how to train supervisory, plant personnel**

Fourth in series on cost reduction for industrial plant management, 12-page booklet deals with various facets of training both plant and supervisory personnel. All elements of a well-rounded training program are included. Such subjects as when to train, who should be trained, what to teach, and who should do the training are all explained in detail.

One chapter outlines various steps in training program, viz: preparation, presentation, application, and follow-up. Suggested check sheet of job analysis in relation to employee, what he has to be able to do, and what he has to know to do it, is also included in booklet.

"How to Train" is issued by Wheeler Associates, Inc., Dept. CP, 15017 Detroit Avenue, Cleveland 7, Ohio. When inquiring specify CP 6176 on handy form opposite last page.



**Many advantages featured  
in FCA hydrocarbon  
separation process . . .**

economic studies for refinery  
applications also encouraging

Having been successfully carried  
through the pilot plant stage, the  
Fluid Char Adsorption (FCA)  
process for separating hydrocar-  
bons is reported to be able to  
compete with the best conven-  
tional processes.

Developed by Standard Oil De-  
velopment Company, Linden, N.  
J., and Esso Laboratories, Baton  
Rouge, La., the process may be  
adapted to the separation of pet-  
rochemical streams from refinery  
residues and natural gas, purifi-  
cation of hydrogen, and concen-  
tration of acetylene from light  
hydrocarbon combustion or crack-  
ing processes.

Continuous countercurrent selec-  
tive adsorption of hydrocarbons  
over finely divided fluidized  
activated carbon is heart of proc-  
ess. Economic studies for several  
refinery applications have been  
encouraging.

Advantages of process are:

- 1) Small absorbent inventory.
- 2) High heat transfer coeffi-  
cients.
- 3) High allowable vapor and  
solids velocities minimize vol-  
ume.
- 4) Adaptability to stagewise  
cooling gives minimum char  
circulation rate, exchanger sur-  
face and utilities.
- 5) Direct char heating with  
combustion gas in reactivation  
operations minimizes high-  
temp equipment problems.
- 6) Solids flow direct, simple.

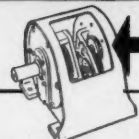
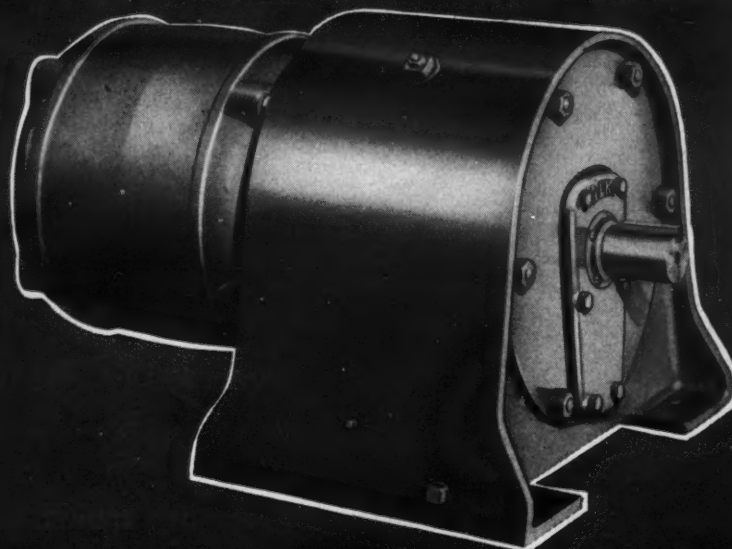
(FCA process may be licensed  
through The Stone and Webster  
Engineering Corporation, Dept.  
CP, Boston, Mass.)

For more information on prod-  
uct at right, specify CP 6177  
... see information request  
blank opposite last page.

# Announcing the -Newly Designed- Integral

ALL-  
STEEL

... with completely standard  
round-frame, D-flange motor



Every FALK Motoreducer  
has these "In-built" Factors—

**Precision Gearing.** Heat treated alloy  
steel, precision cut and shaved helical gear-  
ing throughout . . . quiet-operating crown  
shaved pinions . . . taper bored gears for  
easy ratio changes.

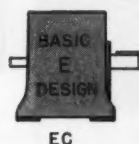
**All-steel Housings.** Unbreakable, strong,  
rigid. Generous overhung load capacities  
provided by wide bearing spans, large shafts  
and bearings.

**Streamlined Inside and outside.** Smooth,  
clean surfaces; machine welded construction  
conforms to NEMA motor frames.

**Positive Lubrication.** Large sump capacity  
. . . oil-tight construction assures clean lubri-  
cant . . . direct dip of revolving elements pro-  
vides positive lubrication at all speeds.

**Wide Speed Range.** Selective ratio combi-  
nations provide output speeds from 1.5 rpm  
to 1430 rpm with stock gears.

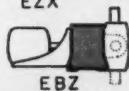
**Sealed Housings.** Dual closures and one-  
way vents keep oil in, dust and moisture out.  
Units are splash-proof, leakproof, dustproof.



EC



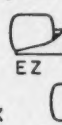
EZX



EBZ



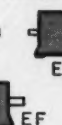
EFX



EZ



EBF



EC-I



EGB

The basic E design permits  
maximum use of standardized  
parts . . . closer control over  
materials, processing, inspection  
and assembly . . . resulting in  
faster delivery from inter-  
changeable stocked assemblies.

# FALK

... a good name  
in industry

THE FALK CORPORATION • 3001 W. Canal St. • Milwaukee 8, Wis.

## Motoreducer

(Gearmotor Type—Supplementing  
Falk All-Motor Line)

### Check and Compare these features...

Meet a faithful old friend in a new,  
modern dress! The famous, time-proved  
Integral Type all-steel Falk Motoreducer  
(Supplementing Falk All-Motor Line) has  
been redesigned into a compact, stream-  
lined unit providing the utmost in space  
economy—but retaining all the application  
versatility, long-life performance, easy-  
maintenance features and superior struc-  
tural qualities that have made Falk Moto-  
reducers the recognized standard through-  
out industry.

In this new Integral unit—rated in  
accordance with AGMA standards—a  
completely standard round-frame, D flange  
NEMA motor is mounted directly on the  
all-steel Motoreducer housing. The motor  
remains a separate piece of equipment,  
readily replaceable with any other type  
or make. Output speed (ratio) can be  
changed within unit's torque capacity with-  
out modifying motor. Size and arrange-  
ment of the standard housing permit wide  
ratio range—from 3.36:1 to 542:1.

In order to meet the greatest number of  
industrial application needs, the newly  
designed Integral Motoreducers are avail-  
able in horizontal and vertical models,  
both in concentric and right-angle types;  
double, triple and quadruple reduction;  
horsepower range, 1 to 40 HP. Prompt  
stock shipment in standard ratios is offered.

Whatever your reduction requirements,  
you get greatest dollar-for-dollar value  
in the long run by standardizing on Falk  
products. Write for Bulletin 3104.

## IDEAS

### Use solvent to restore aircraft engine hp

Thanks to orthodichlorobenzene, American Airlines has found that it can restore aircraft engine horsepower quickly and save itself a lot of work too. Company has developed a simple procedure which eliminates need for disassembling engines prior to schedule, if power losses occur due to excessive gum deposits in carburetor blower section.

Following procedure is used. A  $\frac{1}{2}$ " ID rubber hose, long enough to reach the ground, is connected to the carburetor adapter. With engine running at 1300 rpm, end of hose is inserted into container of technical grade ortho (0.01% max HCl content), and two to three gal are siphoned into blower section in about 30 minutes.

Slow siphoning is more effective than force feeding, since latter has tendency to dilute crankcase oil. Treated engines are not run above 1500 rpm at 30 MAP until all spark plugs are changed. Restorations of up to 2" manifold pressure are not uncommon.

(Information courtesy of Monsanto Chemical Company, Dept. CP, St. Louis 4, Missouri.)

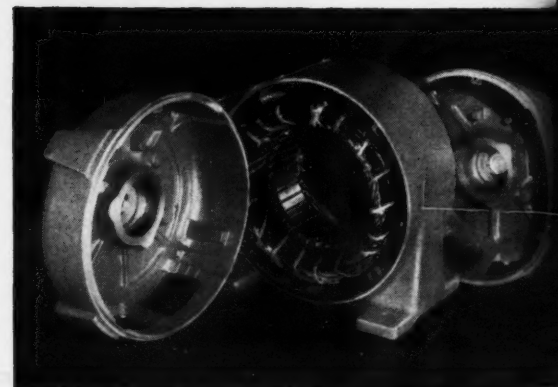
### Rubber-chem laboratory to cost \$2.8 million

Designed to expand sales-service activities of company's Rubber Chemicals Division, \$2.8 million laboratory is being built by Du Pont on Chestnut Run site, near Wilmington, Delaware. Building will accommodate about 200 laboratory personnel and will occupy approximately 62,000 sq ft. Completion is scheduled for first quarter of 1956.

Facilities will include latest equipment for milling, calendaring, extrusion, and vulcanization.

(Information courtesy of E. I. du Pont de Nemours and Company, Inc., Dept. CP, Nemours Building, Wilmington 98, Del.

MOTOR FACTS ON INDUSTRY'S  
MOST-PREFERRED "POWER PACKAGE."



**Electrical System Fact:** New fortified insulation includes exclusive Bondar, Bondite and Mylar\* for greater protection against the toughest operating conditions.

\*Du Pont registered trade-mark

Mechanical  
both d  
opening  
proof v



# FACT:

## The new *Life-Line A* has stronger insulation than any other motor on the market

Meaning what? Simply that the new Westinghouse Life-Line® "A" motor with new fortified insulation can withstand heavier overloads and operate at higher temperatures than any other motor you can buy.

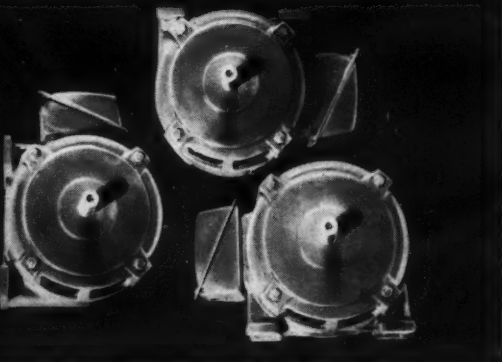
Similar design advances in the mechanical and lubrication systems make Life-Line "A" industry's most preferred motor.

It takes the right combination of *all three systems*—electrical, mechanical and lubrication—to build the best package of power on the market.

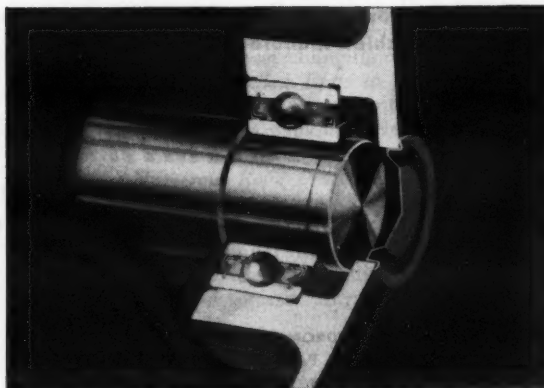
Get all the facts by calling your Westinghouse sales engineer . . .  
*The Man With The Facts!*

J-21877

YOU CAN BE SURE...IF IT'S  
**Westinghouse**



**Mechanical System Fact:** New cast-iron housing on both drip-proof and totally-enclosed types. Ventilation openings only in end brackets make the motor drip-proof whether mounted on floor, ceiling or wall.



**Lubrication System Fact:** New "4-way sealed", pre-lubricated bearing eliminates completely the 3 main causes of bearing failure: 1) contamination, 2) over greasing, 3) wrong grease.

When inquiring check CP 6178 opposite last page

### Complex parts easily produced by frozen mercury process of casting

Complex parts possessing interior coring and gating, which are impossible or impractical to make by other methods, can be easily and economically produced by frozen mercury process of investment casting. "Booking" feature of process permits two or more pieces of frozen mercury to be almost instantly joined with only slightest pressure.

To accomplish this, original die is made in two (or more) halves, separated as a completed unit by a match-plate that is perfectly smooth on both sides. Halves are linked with dowel pins extending through match-plate. Liquid mercury is poured into the halves and when frozen, die is opened and match-plate removed.

The two sides of the die are placed together, bringing opposing smooth surfaces of halves of frozen mercury pattern into perfect face-to-face contact. Slight squeeze or gentle tapping against die is sufficient to cause mercury to weld its surfaces and unite the halves into a single monolithic pattern.

Patterns have been made with as many as twelve separate "booking" operations. Because large and intricate castings can be produced, cost savings are realized through elimination of assembly operations, reduced inventories of individual parts, and elimination or reduction of machining.

(Courtesy of Mercast Corporation, Dept. CP, 295 Madison Avenue, New York 17, N. Y.)

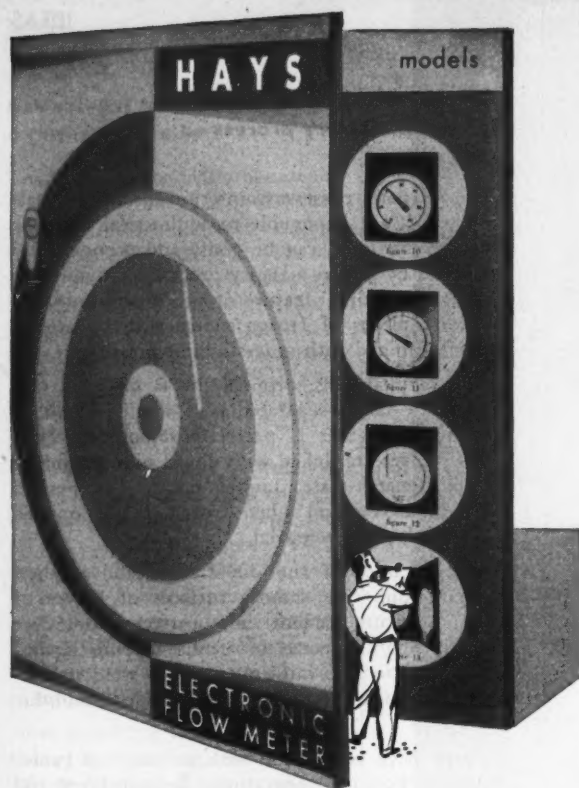
### New Diamond Alkali laboratory pursues nuclear research

Atomic radiation research laboratory at Painesville, Ohio, makes Diamond Alkali one of the first chemical companies to have nuclear facilities for industrial research. Laboratory is completely equipped to handle both high and low energy radioactive materials. Entire project was financed by the company.

Radiation is supplied by 1000-curie cobalt source, fabricated by AEC's Brookhaven National Laboratory. This is equivalent to the radiation from 2.2 lb of radium, which at present is almost one-half the available world supply of radium. Tracer quantities of other radioactive elements will also be used.

Laboratory will further exploration of possibilities presented by harnessing gamma rays for chemical applications—particularly on polymerization, oxidation and chlorination reactions.

(Information courtesy of Diamond Alkali Company, Dept. CP, 300 Union Commerce Building, Cleveland 14, Ohio.)



## a guide to better flow metering

Here's a new fact-filled, technical booklet that tells you feature for feature how the new Hays electronic flow meter excels.

**Electronic operation**—provides maximum accuracy ( $\frac{1}{4}\%$  of full scale differential), and speed (4 seconds for full scale pen travel).

**Mercuryless transmitters**—rupture-proof metallic bellows for differential pressure measurement.

**Continuous integration**—motor-driven, continuous mechanical integrator is extremely accurate even on rapid load changes.

Other features include powerful motor, easy readability, accuracy unaffected by normal temperature changes, optional explosion and weather-proof transmitter.

Write now for bulletin 54-1074-222 and get the important facts.

Automatic Combustion Control  
Boiler Panels • CO<sub>2</sub> Recorders  
Variable Meters and Variable  
Gas Analyzers • Draft Gages  
Combustion Test Sets  
Electronic Oxygen Recorders  
Electronic Flowmeters  
Electronic Feed Water Controls  
Miniature Remote Indicators

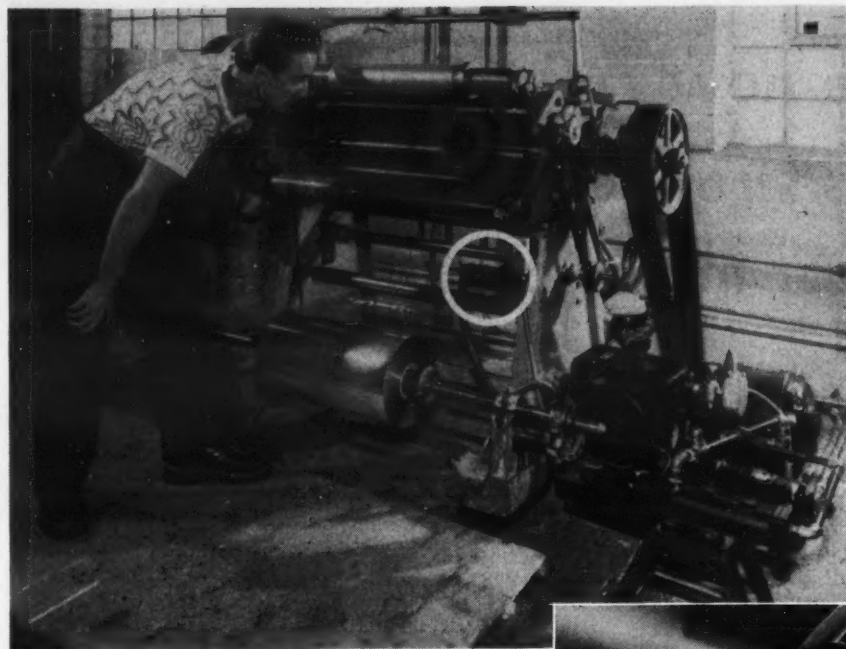
# hays

CORPORATION

MICHIGAN CITY 12, INDIANA

When inquiring check CP 6179 opposite last page

## instrumentation & control



Clear cellophane web is positioned by edge guide unit on slitting machine (above). Operator adjusts setting of edge guide. Diaphragm regulator and jet pipe relay are in foreground

Changing from hand to automatic control of web edge alignment enabled manufacturer to . . .

## eliminate roll trimming, up production 160%

**RAY GENDRON** Factory Superintendent  
Transparent Paper Products Ltd.,  
with CP Staff

**Problem:** Hand control of webs on slitters resulted in re-winds and errors in the Montreal plant of Transparent Paper Products Limited. Rolls of cellophane, polyethylene film, pliofilm, and other wrapping materials handled by company must be precision cut to fit automatic packaging machinery of their customers. Transparent Paper

Products had more than 400 customers wanting thousands of different sizes of plastic wrapping materials. Company's two slitting machines were hard pressed to keep up with demand. Rolls had to be trimmed on both edges — an extra operation. Management's aim was to increase speed of slitters and produce perfectly wound rolls which would match tolerances of automatic packaging machinery.

**Solution:** Askania Edge Guide was installed after being recommended by another wrapping material converter. Askania unit consists of sens-







Polyethylene sheeting moves through web edge sensing nozzle at right

ing nozzle, jet pipe relay, diaphragm, and cylinder for positioning web.

Rectangular orifice above edge of moving web receives air pressure (at about one and one-half inches of water) from second similar orifice below web. As edge of material moves over to reduce effective opening, received pressure drops off. Recovered pressure is carried to regulator diaphragm. Regulator amplifies pressure, converting it to hydraulic force by means of jet pipe relay — a pivoted nozzle through which oil is pumped at approximately 100 psig. Jet pipe directs this oil stream at two closely adjacent orifices that are connected to opposite ends of cylinder.

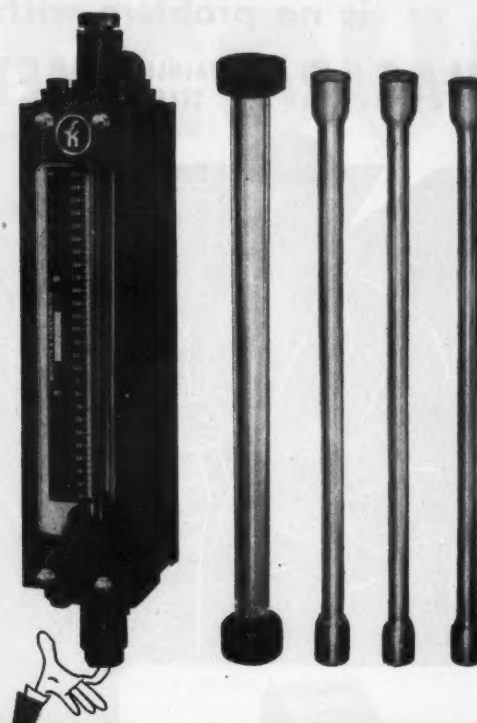
When web is in correct position, jet stream is centered between two orifices producing equal hydraulic pressures at both ends of cylinder. Piston remains stationary when system is in balance. Should controlled edge move away from desired position, air pressure is changed at diaphragm, and jet pipe moves toward one orifice and away from other. This unbalances hydraulic pressures at opposite ends of cylinder and moves piston to correct edge position.

**Results:** When control units were installed, they proved so effective that slitters were re-gearing to run at 600 feet per minute — more than twice the earlier speed of 230 feet per minute. Despite speed up, precision tolerances run closer than 1/32 of an inch. The best tolerances achieved by hand operation with experienced operators were in neighborhood of 1/2 inch. Trimming step was eliminated along with its labor cost and wastage. Since installation of units by workmen at company, there has been no maintenance required.

(Web edge positioning unit is a product of Askania Regulator Co., Dept. CP, 240 E. Ontario St., Chicago, Ill. . . . or for more information check CP 6180 on handy form opposite last page.)

## The versatile **ROTAMETER** for continuous or batch processing

**wide range  
of capacities  
within one  
meter size  
lets you  
measure flow  
under changing  
conditions**



Ever wish for a *versatile* meter? One that adapts *in minutes* to changing rates of flow? You get your wish with the *SK Safeguard Rotameter* because . . .

. . . *Four Sizes of Tubes*, each offering a different capacity, can be used in a single Rotameter.

. . . *Tubes Interchange Quickly*—can be removed and replaced to meet changing conditions.

. . . *Exclusive Belled Ends* of tubes, all having same inlet and outlet OD, permit standardization of end fittings and packings. No special tools or fittings needed.

. . . *Numerous Rotor Designs* can be used within one meter tube to provide wide range of capacities.

Where flow rates change frequently, as in proportioning dissimilar fluids, you'll find the *SK Safeguard Rotameter* outstandingly convenient and economical. Accurate, durable and safe, too, because . . .

. . . *Meter Case of Strong, Rigid Steel* completely encloses tube—protecting against external

shock, acting as a safeguard should tube break accidentally.

. . . *Heavy Gauge, Safety Glass Windows* provide excellent view of tube, rotor and scale.

. . . *Detachable Metal Reference Scale* is clearly marked for easy reading—can be supplied in units of flow, or in millimeters for use with calibration charts.

. . . *Bronze, Cast Iron or Stainless End Fittings* are designed to permit connection to piping in any of four horizontal positions.

. . . *Non-leaking, Seated, Clean Out Plugs* at top and bottom of end fitting permit rotor removal and tube cleaning without disassembly.

. . . *Packing Glands* are adjustable from outside of case by means of stainless steel cap screws.

Get Your Free Copy of Bulletin 18-RG. It details operating principles, sizes and dimensions, construction features of SK's Safeguard Rotameter. Yours without obligation.



**Schutte and Koerting**

COMPANY

MANUFACTURING ENGINEERS

2215 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

Jet Apparatus • Heat Transfer Equipment  
Strainers • Condensers and Vacuum Pumps  
Oil Burning Equipment • Rotameters  
Flow Indicators • Radiant Tubes • Valves  
Spray Nozzles and Atomizers • Gear Pumps  
Desuperheaters

When inquiring check CP 6181 opposite last page

## "Measuring CORROSIVE LIQUIDS is no problem with NIAGARA STAINLESS STEEL METERS"



**BUFFALO METER CO.**  
2892 MAIN STREET  
BUFFALO, N.Y.

Gentlemen:

Please send me complete information on the use of economical NIAGARA METERS, based on the data below:

Liquid \_\_\_\_\_ Pressure \_\_\_\_\_ p.s.i.  
Temp. \_\_\_\_\_ ° F.  
Flow rate \_\_\_\_\_ g.p.m.  
Maximum batch \_\_\_\_\_ gals.  
Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_

Whether you're measuring caustic soda, acids, molten sulphur or many other corrosive liquids, you want reliable measurement all the time. NIAGARA METERS—made of type 316 stainless steel—resist damage from a wide range of corrosive products. Maintenance is kept to the absolute minimum because of the unusual simplicity in construction of NIAGARA METERS.

If you process or use liquids of a corrosive nature, it will be to your advantage to investigate NIAGARA.

Send in the Data Request blank below today

When inquiring check CP 6182 opposite last page

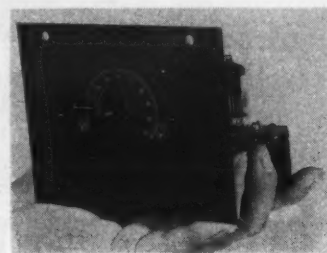
## INSTRUMENTATION

**Relay on interval timer  
handles loads  
of 10 amp**

**Uses:** Suitable for pushbutton, foot switch or other actuation of controlled interval operations.

**Features:** Timer circuit uses two filament-less, cold cathode tubes to eliminate warmup time and provide timing intervals from 0.05 to 7 seconds.

**Description:** Output of circuit is fed into SPDT electromagnetic



relay with normally open, 10-amp contacts. Circuit requires only 0.1w for operation from 105-125v, 25-400 cy AC. Unit is supplied for panel mounting or in steel box 3 x 4 x 5".

(Type 12MC timers are products of G. C. Wilson & Co., Dept. CP, 1950 8th Ave., Huntington, W. Va. . . . or for more information check CP 6183 on handy form opposite last page.)

**Catalog shows line  
of rectifiers**

Line of selenium rectifiers and controls for electro-chemical industries are presented in illustrated, 12-page catalog. Publication also covers auxiliary equipment such as remote control unit, timer, automatic voltage and current regulators, shunts, and periodic reverse controls for generator field.

Cat 441 is issued by American Rectifier Corp., Dept. CP, 95 Lafayette St., New York 13, N.Y. When inquiring specify CP 6184 on handy Reader Service slip which is located opposite last page.

• FOR GAUGING LIQUIDS  
OF ALL KINDS  
• 100% AUTOMATIC  
• APPROVED BY  
UNDERWRITERS'  
LABORATORIES

**"LIQUIDS WORTH STORING  
ARE WORTH MEASURING"  
WITH A  
LIQUIDOMETER  
Tank Gauge**

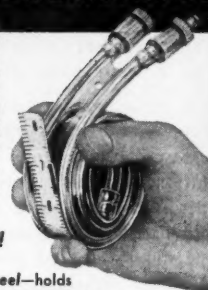
WRITE FOR COMPLETE DETAILS

**THE LIQUIDOMETER CORP.**  
38-18 SKILLMAN AVE., LONG ISLAND CITY, I.N.Y.

When inquiring check CP 6185 opposite last page

**NOW IT'S UNBREAKABLE!**

**DWYER**  
SERIES 1211  
*Flexible*  
**SLACK-TUBE  
MANOMETER**



**Just roll it up  
and tuck it away!**

- **Scale**—convex spring steel—holds Slack-Tube rigid for convenient use and easy reading—regardless of length—yet permits rolling into small space for pocket or service kit.
- **Zero Adjustment**—easily obtained by sliding spring-steel scale in tipped saddle.
- **Connections**— $\frac{1}{8}$ " pipe thread openings and rubber tubing adapters provided.
- **Tough Vinyl Plastic Body**—will serve for years. Several inches allowed for scale adjustment.

- ✓ **Extremely Accurate** ✓ **Easy to read**
- ✓ **Standard ranges from 8 to 120 inches in water or mercury**

Write for complete information

**DWYER** *Specialized*  
**INSTRUMENTS and GAGES**  
F. W. DWYER MFG. CO.  
335 SO. WESTERN AVE. • CHICAGO 12, ILL.

When inquiring check CP 6186 opposite last page

CHEMICAL PROCESSING

Increase  
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Uses:  
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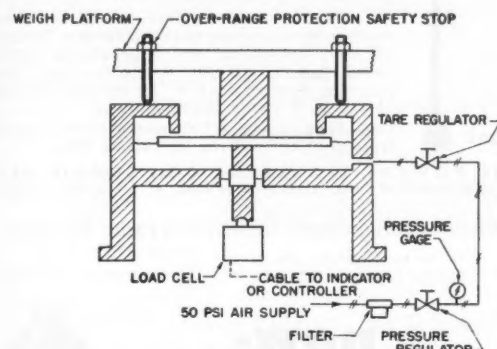
**Increase scale sensitivity  
many fold — cancel tare  
before reading . . .**

strain gages weigh the load electrically, but air pressure balances tare weight

**Uses:** For batch weighing with ranges between 0-100 and 0-10,000 lb.

**Features:** Sensitive strain gage is used for making net weight measurement. Pneumatic cell below platform supports tared weight to achieve maximum sensitivity for small net weights.

**Description:** Electric weigh platform is similar in construction to manufacturer's pneumatic scale. Scale errors can be held to 0.15% of capacity. No levers, knife edges, or springs are used — sustained accuracy is maintained through use of flexures.



Tare pressure times diaphragm area balances tare weight; net weight is sensed by load cell

Speed of response is high because of electronic system involved. Full sensitivity and resolution of strain gage can be employed because system has negligible hysteresis.

When a small net load with large tare is to be weighed, pneumatic tare chamber exerts an upward force equal to its effective area times the tare pressure. This pressure is adjusted by precision regulator so that resultant upward force is equal to tare weight. Load cell will then have applied to it only net weight.

(W/C Electric Platform Weighing Scale is a product of Weighing Components, Inc., Dept. CP, 64 Fulmor Ave., Hatboro, Pa. . . . or check CP 6187 on handy form opposite last page.)

#### Need instrumentation for that process?

You'll find just what you need in the alphabetized, itemized Product Directory on pages 237 to 240. All subjects and products presented in ads and editorial columns are there.

# How to measure Pressure of HOT, VISCOUS LIQUIDS

**T**HE only simple, economical way we know to measure the pressure of viscous liquids at temperatures as high as 750°F.—and particularly those that solidify at atmospheric temperatures—is to use one of the Taylor Volumetric Pressure instruments shown below. These completely sealed systems are ideal for viscous or corrosive liquids or liquids with suspended solids that you just can't measure with a conventional open pressure system. They're good for pressures from 0 to

15,000 lbs. at temperatures as high as 750°F. (650° for continuous service). They can't clog, because only a flexible, corrosion-resistant diaphragm or a fluted bulb are in contact with the fluid to be measured. The ability of these instruments to measure pressure at such high temperatures is a Taylor specialty. Available as indicators, recorders or controllers. Call your Taylor Field Engineer for full details on how they can be applied to your pressure measurement problems.

Taylor Instrument Companies, Rochester, N.Y., and Toronto, Canada.

## HIGH PRESSURE AT HIGH TEMPERATURE



For pressure ranges as high as 0-15,000 psi or as low as 0-600 psi with temperatures to 750°F., (650° for continuous service). Newly designed fluted bulb is highly responsive. All parts exposed to process are of welded stainless steel construction. Tubing lengths up to 50 feet.

## LOW PRESSURE AT HIGH TEMPERATURE



For pressure ranges up to 0-600 psi or down to 0-25 psi with temperatures as high as 750°F., (650° for continuous service). Diaphragms available in stainless steel, copper, monel, silver or tantalum. Tubing lengths to 150 feet.

*Instruments for indicating, recording and controlling  
temperature, pressure, flow, liquid level, speed,  
density, load and humidity.*

**Taylor Instruments**  
— MEAN —  
**ACCURACY FIRST**

IN HOME AND INDUSTRY

When inquiring check CP 6188 opposite last page

# HOKE Flow Sheet

Hoke reports on fluid control



## THREE RING PERFORMERS

...the O-ring stem seal is one of the special features that make Hoke valves star performers in the fluid control field. Hoke needle, toggle and metering valves are designed with Hycar® O-rings because of this kind of performance:

...they seal leak-tight (these valves will pass high vacuum tests right off the production line!)...they stay leak-tight, you can forget about periodic packing adjustments...and they offer finger-tip control with no packing friction or binding.

Hoke pioneered the O-ring in small valve applications and you'll benefit from this engineering leadership in using Hoke valves on your test equipment, in the laboratory or for instrument air lines.

May we send you catalog information on these three ring\* performers?

\*(O-rings, that is)

# HOKE

**HOKE  
INCORPORATED**

Fluid Control Specialists  
140 N. DEAN STREET, ENGLEWOOD, N. J.

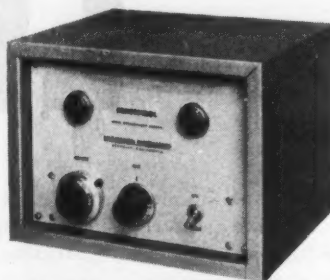
When inquiring check CP 6189 opposite last page

## INSTRUMENTATION

**Sensitivity to 0.005°F temp achieved in controller . . .**

intended for precise temperature control in baths, ovens, etc

Temperature controller is designed for installations where precision control is required. Instrument uses resistance tube temperature bulb



Temperature controller uses bulb with 4 second time constant

which is suitable for temperatures up to 600°F. It is an AC bridge type, providing extra sensitivity. Exclusive of bulb, instrument's sensitivity is 0.005°F.

Various bulbs are available. Standard bulb has time constant of four seconds. For greater sensitivities, faster responsive bulbs or thermistors are available.

(Resistotrol Temp Controller is a product of Hallikainen Instruments, Dept. CP, 1341 Seventh St., Berkeley, Calif. . . or for more information check CP 6190 opposite last page.)

### Discusses application of infrared analyzers

Illustrated six-page folder describes infrared analyzer for continuous in-plant process stream analysis. Principles of operation, detailed specifications, and features of manufacturer's analyzer are given. Bulletin also discusses typical applications of infrared analyzers.

Bul on infrared analyzer is issued by The Perkin-Elmer Corp., Dept. CP, Danbury Road, Norwalk, Conn. When inquiring specify CP 6191 opposite last page.

**Most  
ACCURATE  
Water  
Temperature  
Control Made  
for Industrial  
Processes  
Color Photo Film  
Processing,  
Lens Polishing  
Hydrotherapy,  
etc.**



## POWERS THERMOSTATIC WATER MIXER

Supply Fixture 4629PD, used above by AUTHENTICOLOR Laboratories, N.Y. City, thermostatically mixes hot and cold water and delivers the mixture at any constant temperature desired—regardless of

pressure or temperature changes in water supply lines. Failure of cold

water instantly and completely shuts off the delivery.

Has 4" Easy to Read Dial Thermometer, stop check valves with removable strainers, vacuum breaker, 1/2" pipe connections, and is completely chrome plated. Capacity: 10 gals. per min. at 45 psi. Temperature Ranges 65-115° F.; 60-125° F.; and 75-175° F. Write for Bulletin 367.

(b56)

Large Capacities up to 1000 gpm available in other types of controls. Write for Catalog WC.

**THE POWERS REGULATOR CO., SKOKIE, ILL.**  
Offices in over 50 Cities, see your Phone Book • Established in 1891

When inquiring check CP 6192 opposite last page

**now-  
MEASURE, CONTROL  
LIQUID DENSITY  
continuously and automatically  
with the**

**PRINCO**

Since 1910

# Densitrol



Process industries will welcome the new DENSITROL—the precision instrument that gives a continuous reading of density in flowing liquids such as sugar syrups, brine, acids. DENSITROL electrical indicators or recorders can be located remote from the sampling chamber itself. If desired, DENSITROL can be linked with control mechanisms for automatic regulation. For information on temperature and pressure ranges, calibrations, and other specifics, request Bulletin W-3.

**PRECISION  
THERMOMETER & INSTRUMENT CO.**

1434 Brandywine Street, Philadelphia 30, Pa.

Makers of precision-built thermometers, barometers, hydrometers, gauges, indicators, mercury in glass thermo-regulators.

When inquiring check CP 6193 opposite last page

CHEMICAL PROCESSING



### Finds level of flowable materials — whether wet or dry . . .

based on capacitance measurement, instrument can also read moisture or composition change

**Uses:** Capacitance bridge was designed primarily for measurement and control of levels of liquids, granular solids, interface, and other conducting or non-conducting substances. Capacitance operation also allows instrument to be used for measuring other process variables such as moisture content or changes in composition—or any change which results in a changed dielectric constant.

**Features:** Radio frequency capacitance measurement makes it possible to use instrument with almost any material.

**Description:** Self-balancing recorder-controller can be used in explosion-proof areas with suitable housings.

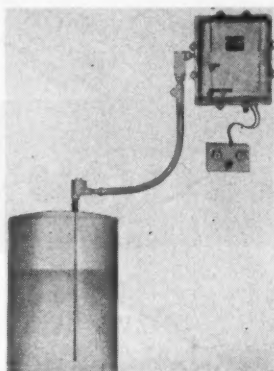
Recommendations cover Class I, C and D hazardous applications. Instrument is capable of accuracies of 1/4 of 1%.

Design is that of a capacitance bridge. One leg of bridge is capacity under measurement. Opposing leg is motor-driven rebalance capacitor. Any unbalance signal is fed to a phase-sensitive demodulator and converted to 60 cycle unbalance signal. This signal is amplified and drives servo motor to rebalance bridge.

Radio frequency is used for measurement. This reduces reactance of measured capacitance to a value which will not be affected by leakage resistance normally encountered in conducting materials. Sixty-cycle amplifier is identical to manufacturer's standard amplifiers. General specifications for instrument setup:

Pen speed	3.5 seconds, full scale
Capacitance range	20-500 $\mu\mu$ fd
Instrument span	5% of terminal capacitance (1 $\mu\mu$ fd minimum) 200% of terminal capacitance maximum
Sensitivity	0.05% of span
Linearity	0.25%

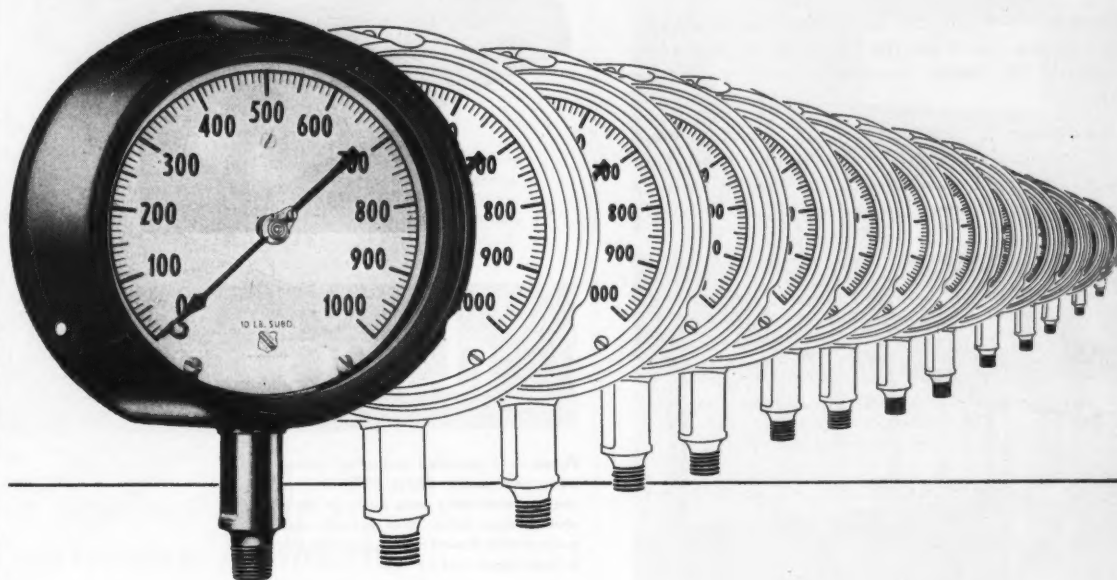
(Series 42 Recorder-Controller is a development of Fielden Instrument Div., Robertshaw-Fulton Controls Co., Dept. CP, 2920 N. Fourth St., Philadelphia 33, Pa. . . or for more information check CP 6194 on handy form opposite last page.)



Probe capacitance is balanced in bridge circuit

# SATISFACTION MULTIPLIED

## 3 x 8 x 8 x 38 x 2 x 5



**Service Conditions** primarily determine the pressure gauge you specify for your installation. The wrong gauge can cost time, trouble, and money.

That's the big reason why Ashcroft Duragauges make sure of your complete satisfaction by offering a multiple choice in case designs and materials, Bourdon tube materials, ranges, movements, and dial sizes. Briefly, you can select the right gauge for your requirements from:

**Cases** of 3 different materials in 8 service-proved designs.

**Bourdon Tubes** of 8 different types of metals to meet specific service requirements.

**Pressure Ranges** from 30" vacuum or a few ounces through 100,000 psi.

**Rotary Geared Movements** that include the famous "Nylon Movement" or all stainless steel.

**Dial Sizes** from 4 1/2" through 12".

Most important, Ashcroft Duragauges provide that unbeatable combination of highest sustained accuracy and durability of any pressure gauge built.



**TAKE ADVANTAGE** of the counsel of your nearby Industrial Supply Distributor. You can count on him to help you select Ashcroft Duragauges that will serve better and longer, with minimum maintenance, no matter how severe the conditions of vibration, pulsation, corrosion and weather.

**In Canada:** Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

## ASHCROFT GAUGES

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT  
MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, Stratford, Conn. 'HANCOCK' VALVES, Watertown, Mass. 'CONSOLIDATED' SAFETY RELIEF VALVES, Tulsa, Oklahoma. AIRCRAFT CONTROL PRODUCTS, Danbury & Stratford, Conn. and Inglewood, Calif. 'SHAW-BOX' AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, Muskegon, Mich.

When inquiring check CP 6195 opposite last page

## INSTRUMENTATION

### Activated by electric eye or treadle, pneumatic control system operates doors

**Uses:** Designed for semi-automatic or automatic opening and closing of doors in plants and warehouses.

**Features:** Units can be activated automatically by treadles, photo-electric controls, or semi-automatically by button, footswitch, panel switch, or cord.

**Description:** Automatic door operator units are pre-piped, pre-wired and mounted on base plate for rapid, easy installation. Safety features include manual operation in event of power failure



Automatic doors reduce heating and air conditioning losses at this midwestern pharmaceutical plant

with no rods or springs to disconnect. Pneumatic operator and controls can be installed in hazardous areas where electrical connections would have to be protected. Self-lubricating motor cushions opening and closing action and prevents slamming.

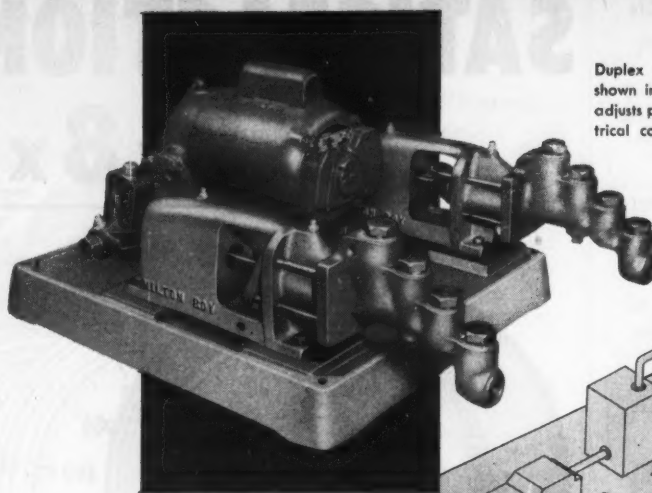
(Economatic door controls are a product of Dept. EC, National Pneumatic Co., Holtzer-Cabot Div., Dept. CP, 125 Amory St., Boston 19, Mass. . . or check CP 6196 opposite last page.)

### Tells solids suspended in coal-water slurry from outside . . .

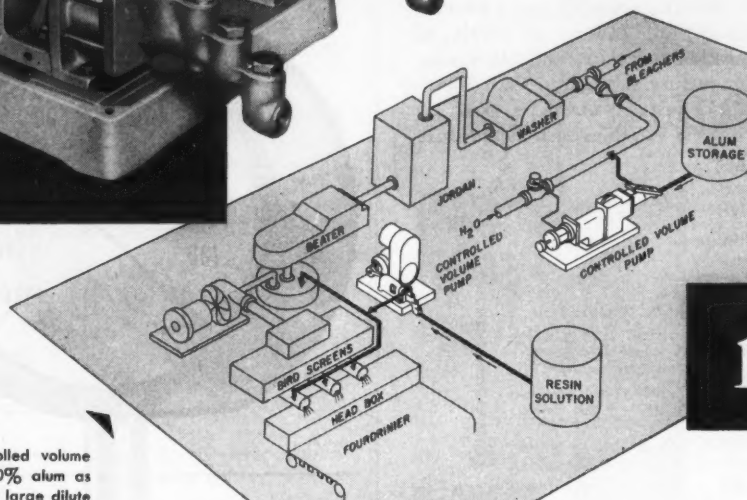
precision is 1.3 per cent of solids or better with clay, coal, magnetite, etc

**Uses:** Indicator is calibrated directly in percentage solids in a slurry. Individual calibrations are available in ranges from 0-40, 40-80, and 80-100 per cent solid.

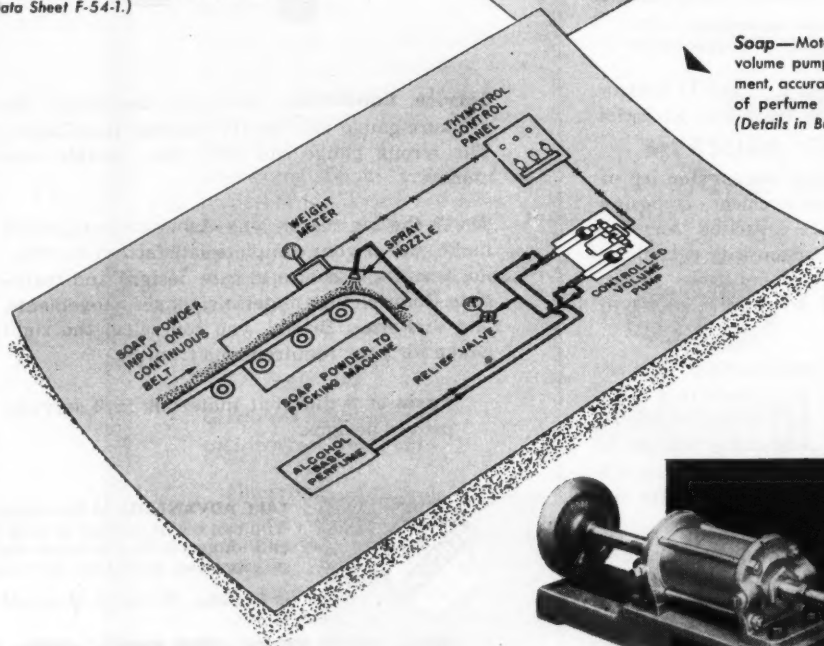
**Features:** Entire mechanism of instrumentation is applied externally to container or pipe in which slurry is handled.



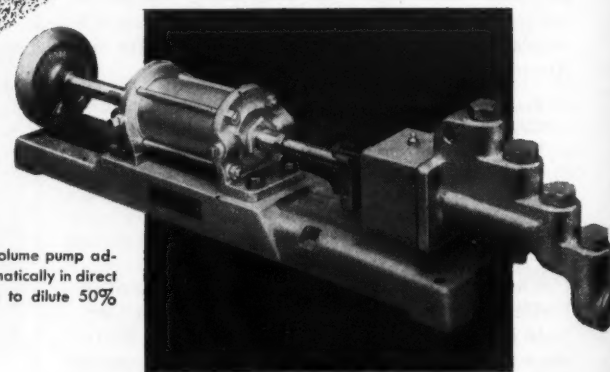
Duplex controlled volume pump. Model shown in perfume addition automatically adjusts pumping speed in response to electrical control signal from weight meter.



**Paper**—Air-operated controlled volume pump continuously dilutes 50% alum as needed, eliminating need for large dilute alum storage tanks. Wet strength resin pump controls flow of resin to pulp. (Details in Data Sheet F-54-1.)



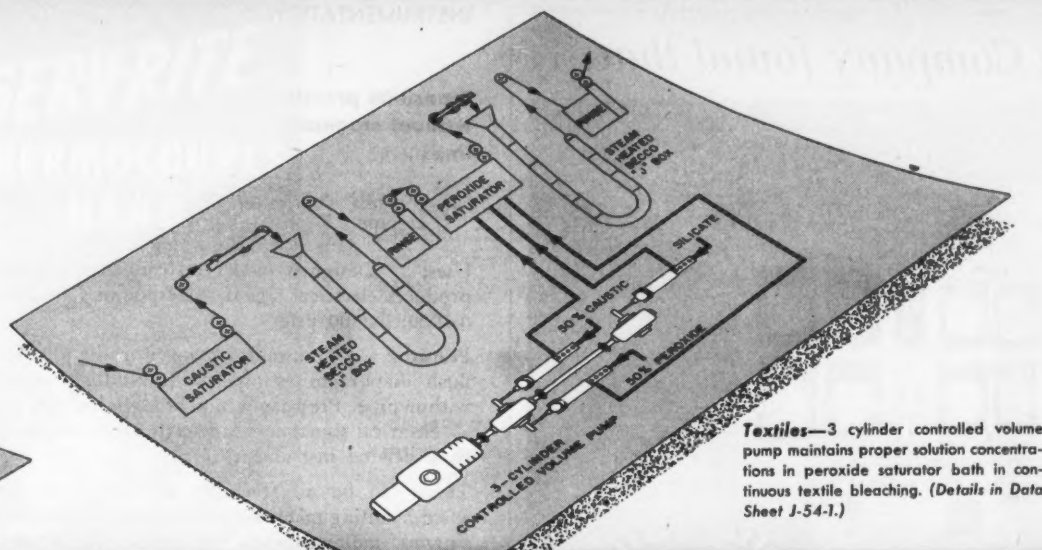
**Soap**—Motor-driven duplex controlled volume pump, acting as final control element, accurately meters low-capacity flow of perfumes in accordance with demand. (Details in Bulletin 1253.)



Air-operated controlled volume pump adjusts pumping speed automatically in direct proportion to water flow to dilute 50% alum.

# new flow





## flow-control approach

*cuts chemical costs...guards product quality...  
accurately meters odorants, corrosion inhibitors,  
filter aids, detergents, defoamers, dyes and  
other process additives*

### Controlled volume pumps are flow control instruments

**P**RECISION metering of additives and other process fluids is very often the key to close quality control and significant savings on chemical costs. In many critical processes, Milton Roy controlled volume pumps are being used to excellent advantage as high-accuracy flow controllers, ratio controllers, and final control elements in the control loop.

Controlled volume pumps are actually flow control instruments . . . particularly valuable for handling low-capacity flows. Reciprocating, positive displacement type pumps, they precisely

meter process additives within 1% accuracy! Pumps are available in capacities up to 1350 gallons per hour . . . pressures up to 50,000 pounds per square inch . . . with manual or automatic speed and stroke adjustment.

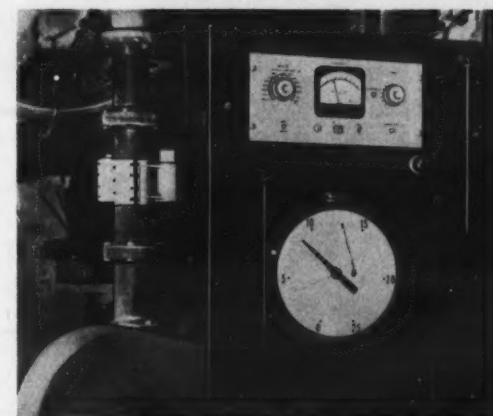
Typical applications are shown here. How can you profit by using controlled volume pumps in your process? Milton Roy offers you long experience in handling low-capacity flow control problems . . . in engineering complete chemical feed and automatic control systems. For details, write for the Data Sheets listed and other technical information. Or, send your problem to the Milton Roy Company, Manufacturing Engineers, 1300 East Mermaid Lane, Philadelphia 18, Pa.

Engineering representatives in the United States, Canada, Mexico, Europe, Asia, South America, and Africa.



When inquiring check CP 6197 opposite last page

**Description:** Per cent by weight of solids or liquids in slurries can be measured or controlled with radioactivity instrument. Radioactive absorption of rays emanating from a small source is measured by Ohmart cells. Measuring components



Asbestos cement-water slurry is falling through pipe here. Gage is attached externally to measure percentage solids in slurry

as well as source are external to pipe for vessel containing slurry being measured. Agglomeration and abrasive conditions encountered with slurry do not interfere, thus, with operation of the gage.

Sensitivity is such that with a 10-inch sample of slurry composed of water and solids material of 2.0 specific gravity, measurements in range of 0-40 per cent solids can be made with a precision of 1.3 per cent of solids. In the range from 40-80 per cent solids measurement is precise to 1.2 per cent solids, 1.1 per cent precision is achieved with solids content above 80 per cent. When solid material has a specific gravity greater than 2.0 precision is also increased.

In a typical application gage is attached to a pipe and measures solid content of slurry falling through the pipe. One such installation is illustrated — asbestos cement-water slurry is being measured.

(Further information about the Model PS Density Gage is available in Bulletin 553 from The Ohmart Corp., Dept. CP, P. O. Box 67, Station B, Cincinnati 22, Ohio. Check CP 6198 opp. last pg.)

### Shows microwave tubes for gas control

Bulletin of six pages, illustrated in two colors, explains nature and purpose of microwave gas tubes.

Bulletin A-20 is issued by Roger White Electron Devices, Inc., Dept. CP, Route 17, Ramsey, N. J. Specify CP 6199 opposite last page.

*The New York & Pennsylvania Company found that...*



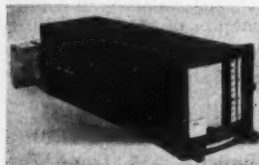
*for complete process instrumentation*

## ONE SOURCE STANDS OUT!

Like other leading companies, the New York & Pennsylvania Company, makers of fine book and specialty papers, found that Fischer & Porter offered them integrated instrumentation and control systems — all from a single source.

Converting their Johnsonburg, Pa., mill from batch-type stock preparation to continuous automatic stock preparation called for five separate blending systems feeding five separate paper machines, plus a complete refiner control system —

all integrated into one centralized control station. And to get the jump on competition, the N.Y. & Pa. Co. had F&P do a complete conversion all in one fell swoop!



Write for details on the F&P Ratographic\* miniature pneumatic recorder-controller, offering 4-inch strip chart record.

\*T.M., F&P Co.

From one source, the N.Y. & Pa. Company obtained the engineering experience and know-how to design and instrument the system, the specialized meters (e.g., Ratosleeve\* stock meters) and valves (e.g., Ratogate\* stock valves) and instruments (all of F&P design and manufacture) to control the processes, and the complete panel fabrication right down to the last graphic symbol.

Because the complete package was obtained from one team, responsibility for delivery and performance was not divided, the cost far less. Perfectly matched instruments, rather than non-mating components, meant complete satisfaction for this customer.

Write today and tell F&P your needs — the answers will be yours quickly, without obligation. Compare and you must agree — F&P is the one source that stands out.



*complete process instrumentation*  
**FISCHER & PORTER CO.**

2145 County Line Road, Hatboro, Pa.

LA 1028

MEASURING, RECORDING AND CONTROLLING INSTRUMENTS • CONTROL PANELS • DATA REDUCTION SYSTEMS  
CONTRACT INSTRUMENTATION RESEARCH • CHLORINATION EQUIPMENT • INDUSTRIAL GLASS PRODUCTS

When inquiring check CP 6200 opposite last page

### INSTRUMENTATION

**Transmits pressure without stagnant lines . . .**

pressure is changed to electric signal right at pipe

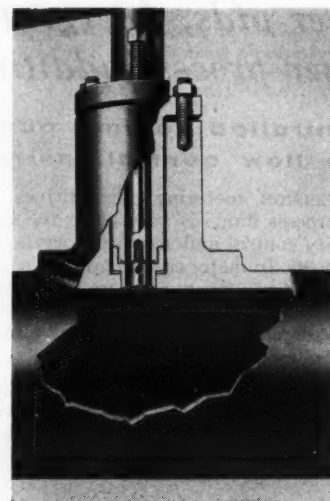
**Uses:** Designed in several ranges, transmitter produces electrical signal corresponding to 0-200, 0-1000, 0-2500 psig.

**Features:** Transmitter mounts on the pipe with flush diaphragm at pipe wall. Nothing extends within pipe. Pressure is not brought outside pipe — electrical signal comes directly from transmitter to associated instruments.

There can be no freeze-up of instrument lines when handling materials such as polymers, asphalts, slurries, molten metals, or viscous fluids which solidify when stagnant.

**Description:** All parts in contact with fluids are made of stainless. Pressure-measuring diaphragm mounts inside a well mounted on pipeline so that diaphragm surface is flush with inside pipe wall. Small displacement of diaphragm is allowed to take place freely — flow through the pipe is not restricted.

Diaphragm flexure is transmitted through a rod and mechanical linkage. Linkage moves core of a



Cutaway shows flush mounting diaphragm and well attached to pipeline

differential transformer which produces an output from 0.000 to 0.500 AC volts. Electrical output is directly proportional to pressure being measured.

Transmitter is continuously adjustable from 0-200 to 0-1000 psig, for example. Another adjustable range encompasses 0-1000 to 0-2500 psig. Standard models operate to 300°C (572°F). Special high temperature units are also available.

CHEMICAL PROCESSING

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**CLAUD**  
Manufact  
Thermocouples  
Instrument  
Mete

603 West  
2031 Ham

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APRIL,



# "SERV-RITE" THERMOCOUPLE HEAD



## the head that's ahead in every way . . .

This new "Serv-Rite" thermocouple head is actually small enough to be held comfortably in the palm of your hand. But size is only one of the many features that make this thermocouple head really extraordinary. It is loaded with installation and service conveniences that any user of thermocouples will appreciate at once.

The body is of malleable iron, cadmium plated for durability. A new type friction lock assures easy removal or tightening of the cap—a quarter turn does it. An asbestos gasket makes the head dirt- and moisture-proof. With a choice of 1/2", 3/4", or 1" IPS opening for the protecting tube, you can standardize on one style head.

The connector block is of a material especially selected to withstand, without damage, temperatures up to 900° F. in continuous service. Improvements over the conventional type of inserts greatly simplify the making of the lead wire connections. The complete thermocouple element, including connector block, can be easily withdrawn for inspection.

Install a "Serv-Rite" thermocouple head and see for yourself how much better it really is.

Write for complete details

4421

**GORDON  
SERVICE**

**CLAUDE S. GORDON CO.**

Manufacturers • Engineers • Distributors  
Thermocouples & Accessories • Temperature Control  
Instruments • Industrial Furnaces & Ovens  
Metallurgical Testing Machines

603 West 30th Street, Chicago 16, Illinois  
2031 Hamilton Avenue, Cleveland 14, Ohio

When inquiring check CP 6201  
opposite last page

## INSTRUMENTATION

Sensitivity is 0.005%, reproducibility 0.1% and accuracy 1%. Transmitter is not sensitive to temperature changes.

(P3T Pressure Transmitter is a development of The Swartwout Co., Dept. CP, 18511 Euclid Ave., Cleveland 12, Ohio . . . or for more information reader may simply check 6202 on handy Reader Service slip which is located opposite last page.)

**Stainless as well as brass  
used to house thermostat  
for 0-600°F . . .**

and metal body can be clamped in place without changing calibration

**Uses:** For temperature indication and control in the range from 0-600°F.

**Features:** Cartridge will withstand mechanical clamping without affecting calibration set point. Shell can be made of stainless where corrosion is a factor.

**Description:** Cartridge thermostat is designed to screw into well or be clamped in place. Since metal shell is not part of thermostatic measuring



Electrical contacts of this thermostat can handle 1200 watts

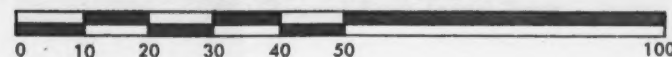
system, slight pressure on outer shell has no effect. Operating ranges are available from 0-600°F and contact ratings permit 1200 watts of non-inductive load to be switched at 115 or 230 volts AC.

Construction is sealed so that parts cannot become contaminated. Lead wire is strain-relief protected. Calibration is not changed by vibration.

Both normally open and normally closed contacts can be provided.

(Model FM-132 Cartridge Thermostat is a product of George Ulanet Co., Dept. CP, 418 Market St., Newark 5, N. J. . . or for more information check CP 6203 on handy form which is located opposite last page.)

## SCALE OF MILES



**. . . accurate liquid level gauging-  
at ANY DISTANCE!**



**"Varec"**  
**PULSE CODE**  
TELEMETERING SYSTEM  
(PATENTS APPLIED FOR)

THE VAPOR RECOVERY SYSTEMS COMPANY has successfully eliminated the one great drawback to accurate transmission of remote tank gauging over long distances—loss or gain of a part of the signal.

Through use of the pulse code method of message transmission the system utilizes a separate pre-arranged code for each 1/8" increment of measurement.

At the receiver, the code transmitted by the tank unit is translated into the equivalent measurements—there can be no borderline cases where the reading might fall between two increments. The receiver will either produce the correct reading as transmitted or it will not produce any reading.

Obviously such an exact system is not confined to liquid level metering alone. It can be readily applied to numerous supervisory control problems such as remote control of pump motors, control valves and associated equipment. Thus the complete dispatching operation, gauging and remote control is integrated into one single unitized system when a "Varec" Pulse Code Telemetry System is installed.

The equipment is also capable of providing tank liquid level alarms or warnings of any off-normal conditions at the remote control point. Further, the receiver readings may be fed into automatic printing equipment for a permanent record and automatic sequencing equipment may be added to provide fully automatic tank gauging.

Before you install any type of remote gauging we urge you to thoroughly investigate the "Varec" Pulse Code Telemetry System—write today for complete details.

**"Varec"**

**THE VAPOR RECOVERY SYSTEMS CO.**  
COMPTON, CALIFORNIA  
Cable Address: VAREC COMPTON  
Calif. (U.S.A.) All Codes

961-2

When inquiring check CP 6204 opposite last page

REMOTE  
DIALED WEIGHT  
SELECTION BELONGS  
IN YOUR BUSINESS  
THIS NEW FREE BOOK  
TELLS THE FULL STORY  
OF

RICHARDSON **SELECT-O-WEIGH**®

## REMOTE WEIGHT SETTING SYSTEMS

Here are answers to the puzzlers you've had about completely automatic weighing, proportioning and blending. Richardson's new 28-page booklet shows in detail how industries like yours use Select-O-Weigh systems to "dial" as many as 20 individual ingredient weights in formulas.

Many industrial "case histories" and over fifty easy-to-understand diagrams and illustrations take you through Richardson's material-saving, time-saving, labor-saving story of finger-tip formulation which requires no manual changes, even

for fractional proportions. Send for this free booklet today. See how a Select-O-Weigh system—developed out of Richardson's 50 years of experience in building automatic weighing, proportioning and blending equipment—can solve countless problems in your change-over from conventional weighing and proportioning methods to automation.

Write today for your free copy of Bulletin 0351.



### RICHARDSON SCALE COMPANY Clifton, New Jersey

Atlanta • Boston • Buffalo • Chicago • Cincinnati • Detroit  
Houston • Memphis • Minneapolis • New York • Omaha  
Philadelphia • Pittsburgh • San Francisco • Wichita • Montreal  
Toronto • Havana • Mexico City • San Juan

**Richardson**

MATERIALS HANDLING BY WEIGHT SINCE 1902

When inquiring check CP 6205 opposite last page

## INSTRUMENTATION

**Send audio tones over any carrier  
to control remote equipment,  
bring back readings . . .**

up to 90 points can be supervised and controlled with 12 frequencies

Any type of communications equipment capable of carrying audio signals (microwave, VHF radio, power lines, telephone lines) can be used to read instruments and control equipment at remote locations. Unlike remote control equipment using multi-conductor cables, system cost does not increase greatly when long distances must be covered.

Operator can control and supervise remote circuit breakers, valves, pumps, etc. System also provides continuous indication of variable readings at a remote location. Alarms can be added.

An error-preventing feature of the system is a "select before operate" sequence. Device to be operated is selected by pressing a button, then coded signal using two specific audio frequency tones in sequence is transmitted to remote location verifying setting of the device at that time. Automatically, another coded signal is returned to control panel to confirm position of remote device. Confirming signal actuates a white light which acts as a go ahead signal. Total time for this to be carried out is 1½ seconds.

Heart of the system is an electro-mechanical resonant unit which generates a stable frequency. Companion unit to the generator responds at opposite end of the line. Ninety individual points can be controlled and/or supervised with 12 audio tones. Design also permits almost unlimited expansion.

(Vibrasender is a development of Motorola Communications and Electronics, Inc., Dept. CP, 4501 Augusta Blvd., Chicago 51, Ill. . . or for more information about manufacturer's product reader may simply check CP 6206 on the convenient Reader Service slip which is located opposite last page.)

**Regulator will handle  
15 cubic feet/minute  
of 150 psi air . . .**

compact unit is only 7½-inch long by 3¾ inches in diameter

Uses: Provides clean dry air for instrument service from high pressure source.

Features: Will supply up to 15 cubic feet per minute from a maximum inlet pressure of 150 psi.

Description: Adjustable output regulator effectively separates water from instrument air. Automatic relief is provided if regulator pressure exceeds preset value. Large capacity dripwell is pro-

vided in  
the area  
Dripwe  
With a  
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**Install  
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(Liquid  
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Jervis, N





Pushbutton valve empties dripwell

vided in resinous bonded filter element 35 times the area of standard  $\frac{1}{4}$ " pipe. Unit is easily cleaned. Dripwell is drained by simple pushbutton valve. With adjusting screw fully extended unit is  $7\frac{1}{8}$  inches high. Diameter is  $3\frac{3}{8}$  inches.

Regulator may be mounted on a panel, bracket, or line. Valve spring is stainless steel. Diaphragm is made of nylon and Buna N. Cast aluminum body is chemically treated for corrosion resistance.

(Model 55 Regulator is a development of Kendall Controls Corp., Dept. CP, 144 Moody St., Waltham, Mass. Check CP 6207 opposite last page.)

#### Install level indicator on pressure vessels through fittings

**Uses:** For installing remote indicating or recording, controlling liquid level measurement in existing tanks or pressure vessels.

**Features:** System can be installed through existing nozzles, handholes, manholes, or other tank fittings.

**Description:** Part of the system is a "bob" suspended from tape spooled in a sealed housing. Spool is connected to electric motor drive so the bob can be raised or lowered. Two electrical contacts in the bob — one slightly higher than the other — control its action. When neither is in contact with liquid, spool is rotated to lower bob.

When lower contact touches liquid, motor is stopped. When upper contact reaches liquid, motor is reversed to raise bob.

System is adaptable to pressure or vacuum surface, can be provided in explosion-proof, dust-proof, and weather-proof constructions.

Four basic forms of the system are standard. These provide level indication only, level indication and recording, level indication and on-off control, or modulating control.

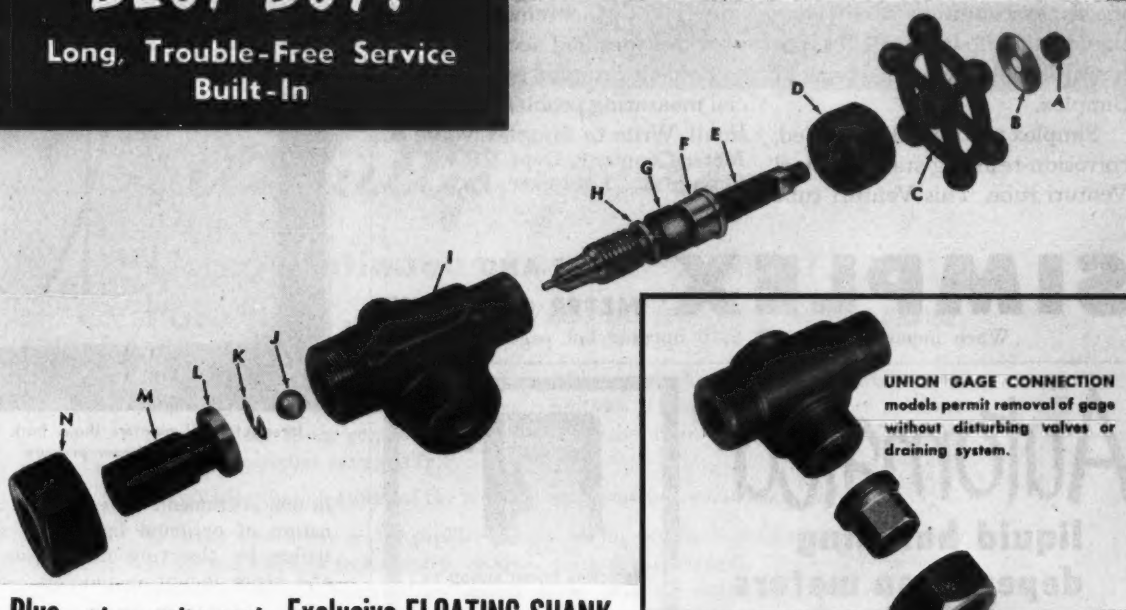
(Liquid level control monitor is a development of Techniflex Corp., Dept. CP, 55 Jersey Ave., Port Jervis, N. Y. Check CP 6208 opposite last page.)

## HERE'S WHY PENBERTHY GAGE VALVES ARE YOUR BEST BUY!

Long, Trouble-Free Service  
Built-In

#### Penberthy Type 300 Standard Liquid Level Gage Valve "Du-Lux" Black Enamel Finish

- A Steel Locknut
- B Identification Plate
- C Steel Wheel or Lever
- D Steel Stem Packing Nut
- E Stainless Steel Standard or Quick-Closing Stem
- F Stainless Steel Packing Gland
- G High Temperature Resisting Stem Packing
- H Stainless Steel Stem Packing Retainer
- I Forged Steel Body
- J Stainless Steel Ball
- K Stainless Steel Ball Retainer
- L Patented "Floating Shank"
- M Steel Tailpipe
- N Steel Coupling Nut



#### Plus...at no extra cost...Exclusive FLOATING SHANK

No other gage valve has all of the quality features of a Penberthy. Features that add up to top performance at lowest cost. You can see that for yourself in the "exploded" view of a Penberthy valve. In addition, the FLOATING SHANK is a time and labor saving feature that cuts installation and replacement costs by 50% or more. It also eliminates strain, caused by a forced installation, with its subsequent danger to the entire installation.

Try Penberthy Gage Valves on your next installation. See for yourself why they are your best buy. Obtain them through your local supplier or direct. WRITE for Catalog No. 35 showing the complete line . . .

#### PENBERTHY INJECTOR COMPANY

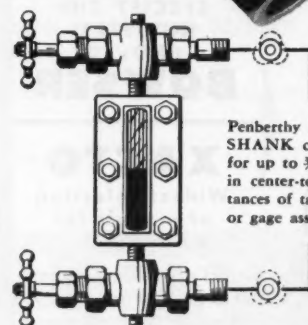
Division of the Buffalo-Eclipse Corporation

1242 Holden Avenue, Detroit 2, Michigan

There's Certain Satisfaction in **PRODUCTS BY**

**PENBERTHY**

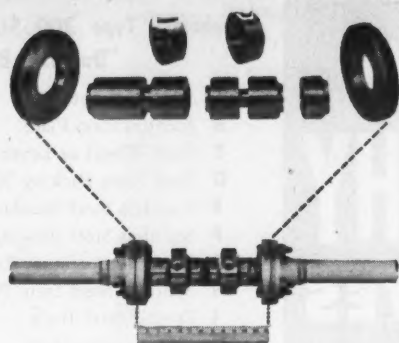
- GAGES
- EJECTORS
- EDUCTORS
- EXHAUSTERS
- SYPHONS
- ELECTRIC SUMP PUMPS
- CYCLING JET PUMPS
- INJECTORS



Penberthy FLOATING SHANK compensates for up to  $\frac{3}{8}$ " variation in center-to-center distances of tank tappings or gage assembly.

When inquiring check CP 6209 opposite last page

## Miniature Venturi Tube Solves Unusual Problem



An important chemical producer looked everywhere . . . couldn't find a ready-made device to measure accurately a corrosive liquid's low flow of 159 lbs. per hour. So he asked the advice of Simplex.

Simplex tailor-made a welded, corrosion-resisting stainless steel Venturi tube. This Venturi tube

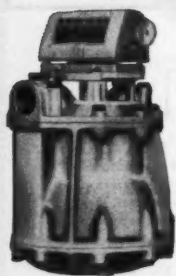
probably is the smallest in industrial process use. Main diameter is only 0.375"; throat diameter only .105". Machining to .0005" provides specified accuracy.

Consult Simplex on your special measuring problems, large or small. Write to Simplex Valve & Meter Company, Dept. CP-4, 7 E. Orange St., Lancaster, Pa.

## SIMPLEX® VALVE AND METER COMPANY

When inquiring check CP 6210 opposite last page

## Automated liquid handling depends on meters



SPECIFY THE  
INDUSTRY-  
PROVED  
**BOWSER**

**XACTO**  
Widest selection  
of models for  
every plant...

Choose from the world's leading, most widely used line. XACTO meters are easily adapted with choice of dials and controls for changing needs to speed liquid handling operations and provide accurate accounting.

GET ALL THE DATA YOU NEED NOW  
...WRITE...

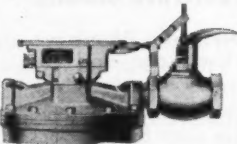
**BOWSER**  
ESTABLISHED 1885

**BOWSER, INC., FORT WAYNE, IND.**  
1315 E. CREIGHTON AVE.

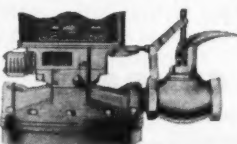
When inquiring check CP 6211 opposite last page



Recording printer mounts on meter. Prints quantity dispensed or received.



Delivers predetermined quantities up to 10,000 gallons, then shuts off.

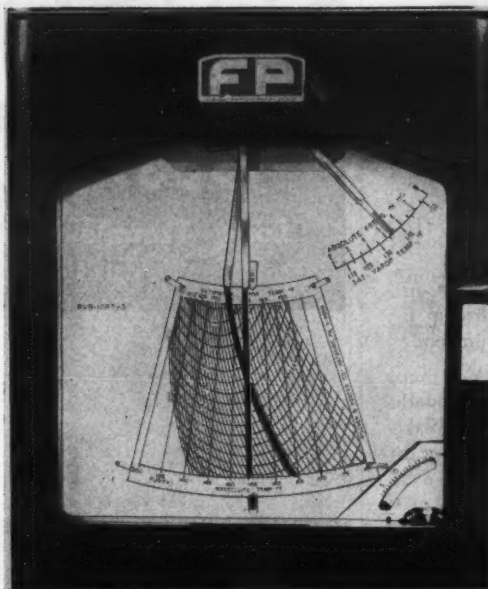


A repeating control for delivery of predetermined quantities. Automatic. With or less recording printer.

## INSTRUMENTATION

### Controls vacuum pans for full capacity

Controller for vacuum pans permits operation at full evaporating capacity without formation of false grains in cane sugar strikes with apparent purities of 60 to 100%. Thermal element and absolute pressure indicating controller are combined



Intersection of pointers shows both temperature and vapor pressure

in one instrument. This provides accurate determination of optimum instant for seeding of grain strikes by observing intersection of temperature and vapor indicating pointers.

(Vacuum Pan Supersaturation Controller is a development of Fischer & Porter Co., Dept. CP, 292 Jacksonville Rd., Hatboro, Pa. . . . or for more information check CP 6212 on handy form opposite last page.)

### Uses rough and tumble parts but achieves close control of temperature . . .

bridge circuit compares thermocouple and standard voltage; standard is taken from line

Uses: For direct control of electric furnaces or ovens and other industrial heating devices which can be controlled electrically.

Features: Operating on a potentiometer principle, instrument does not use standard cells, batteries, magnets, or other conventional reference devices. All parts of instrument are rugged.

## Time the flow of Gas . . . Liquids . . . Solids in Split-Second Intervals with the POST INTERVAL TIMER



The Post electronic "Interval Timer" permits fractional second timing of any industrial operation. One or more different functions can be controlled by various models.

60 Cycle, line-current, is converted to 120 impulses per second. Desired "action-intervals" can be set in increments as fine as 1/120th of a second, and the timer will automatically time the operation. Controls are easily set . . . stay in position.

Filling operations, conveyor feeding, etc. are ideally solved by this latest Post development. Write for details.

Electronic Products Division  
Dept. 551

**POST**  
MACHINERY CO.  
Beverly, Mass.

When inquiring check CP 6213  
opposite last page

CHEMICAL PROCESSING

Description with voltage in this means of in degree within 1 between

Voltage fraction temperat fed to a controls opens on ature dia

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Instrume can be su control. thermoco

(Amplitr ment of 476 Huff formation

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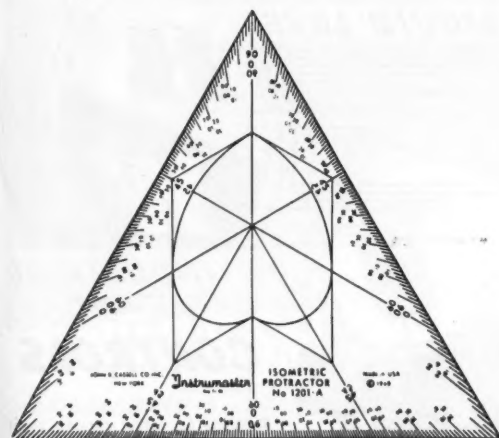
**Description:** To achieve potentiometer operation without necessity of standardization, known voltage is balanced against thermocouple voltage in this controller. Bridge system is adjusted by means of a large knob which turns dial calibrated in degrees Fahrenheit. (Accuracy of dial setting is within 1% of scale range and operational band between the on and off points is 4°F.)

Voltage from the thermocouple is compared with a fraction of line voltage depending on setting of the temperature dial. Difference of these voltages is fed to a saturable reactor. Output of this reactor controls the firing or cut-off of a Thyatron which opens or closes power relay. Aside from temperature dial itself, relay is the only moving part.

In operation, operator turns dial to the desired temperature. Red light on the instrument glows during heating period. When set temperature is reached, red and green lights flash alternately as controller goes on and off.

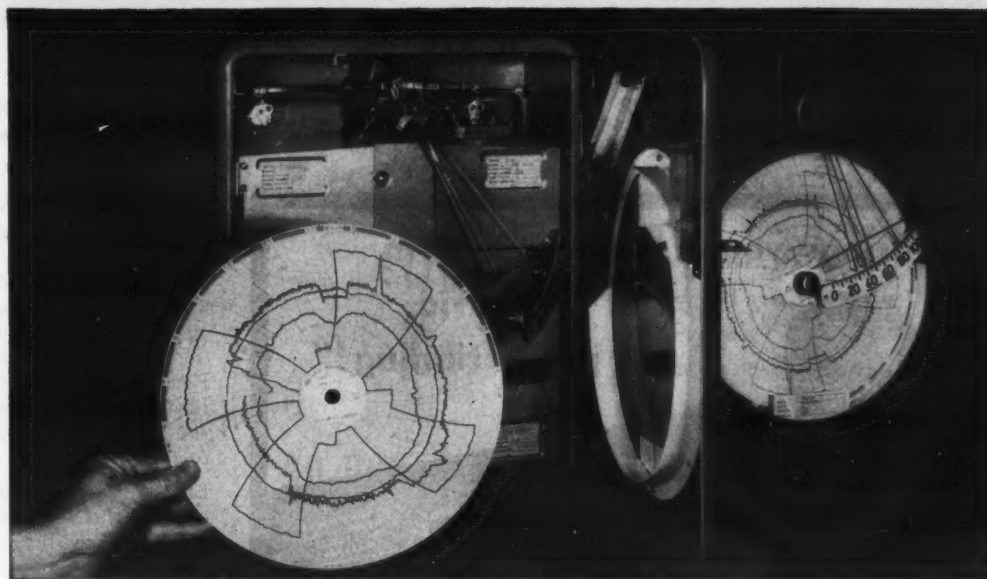
Instrument is immune to vibration, dust. Scales can be supplied for either Fahrenheit or centigrade control. Either iron-constantan or chromel-alumel thermocouples can be used.

(Amplitrol Temperature Controller is a development of Thermo Electric Mfg. Co., Dept. CP, 476 Huff St., Dubuque, Iowa . . . or for more information check CP 6214 opposite last page.)



This isometric-dimetric protractor makes it possible to add details and angle lines to isometric drawings without "boxing," using coordinates, or other "gymnastics." Two sets of 180° graduations are numbered from 0 to 90° clockwise and counter clockwise. Scales read from either side of protractor.

Isometric protractor #1201-A is manufactured by John R. Cassell Co., Inc., Dept. CP, 110 W. 42nd St., New York 36, N.Y. . . . or check CP 6215 opposite last page.



## Faithfully yours -

### Clear, Continuous Records without Poisoning . . . on the New Bailey Recorder

★ Faithful chart records of measured variables are the key to a meaningful, dependable analysis of operating trends and conditions. Money spent for more accurate metering, for faster response, is money down the drain—unless it's matched with chart records that are equally accurate.

That's why these features of the new Bailey Recorder are important to you:

1. Bailey's exclusive sealed capillary-action inking system maintains continuous flow to the pen tip, and traces sharp, opaque, quick-drying records. "Poisoning" of intersecting records is practically eliminated; no blots or smears during operation or chart changing.
2. Pens are mounted on concentric centers, trace on parallel time arcs only 42/1000" apart. This simplifies analysis of two or more records.
3. Interchangeable plug-in receiver units permit practically limitless record-grouping combinations.

Write for Product Specification E12-5 and actual chart sample.

FIG-1



#### ONLY BAILEY OFFERS ALL THESE ADVANTAGES IN A SINGLE RECORDER

- Pre-calibrated plug-in receiver units
- Up to four pneumatic or electronic receivers—or two receivers and two integrators
- Any four variables on one chart—easily read and interpreted
- A full year's ink supply at one loading
- Faster shipment—from stock
- Minimum inventory of parts
- Minimum instrument investment for process cycle expansion or alteration

# BAILEY

METER COMPANY

1074 IVANHOE ROAD

CLEVELAND 12, OHIO

*Controls for Power and Process*



*Controls for*

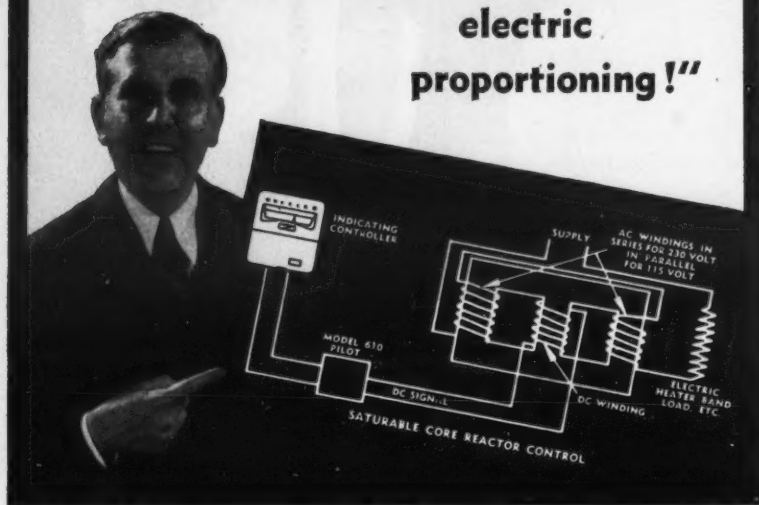
TEMPERATURE  
PRESSURE  
GAS ANALYSIS  
FLOW LEVEL  
RATIO DENSITY

When inquiring check CP 6216 opposite last page

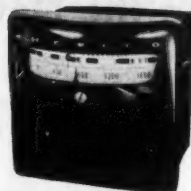


## NEW Wheelco Model 407 Capacitrol

"Brings you a new concept in  
electric  
proportioning!"



A totally different idea  
in a totally new instrument



It's a *new* form of proportioning control . . . now available in a *new* Wheelco Instrument that has all the advance-design features you've been waiting for!

You can improve product quality through "stepless" proportioning made possible by this exclusive Wheelco development. A saturable core reactor is used to control power input to the electrical heating unit. Output is varied through an infinite number of power levels from a maximum of 90% of rated capacity to a minimum of 3% as demands of the sensing units vary from maximum to minimum. Easily applied to a variety of heating operations . . . it will give you results unmatched by conventional temperature control methods.

Write for Bulletin F-6314-1 describing the "Model 407" and five other control forms available in the new Wheelco 400 Series Capacitrols!

### WHEELCO INSTRUMENTS DIVISION

BARBER-COLMAN COMPANY, DEPT. P, 1520 ROCK ST., ROCKFORD, ILLINOIS  
BARBER-COLMAN OF CANADA, LTD., DEPT. P, TORONTO, ONTARIO, CANADA

Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Small Motors  
Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

When inquiring check CP 6217 opposite last page

### INSTRUMENTATION

**Graphically represents  
ion exchange system  
operation . . .**

allows operator to check quickly  
condition of demineralizers

Graphic panel arrangement for all automatic ion exchange equipment allows operator to see at a glance if system is functioning properly. Panel control board shows ion exchange units and immediate piping and valves in addition to housing controls, meters, and recorders.

Each valve representation has two colored lights — green light signals open valve; red light, closed valve. Pipe lines are shown in colored lights with a different color for each material being carried. Panel system is especially useful for large utility demineralization plants, mixed-bed and two-bed demineralizers and hydrogen-sodium blend systems. Units can be modified to meet individual plant needs.

(Graphic panels are a product of Graver Water Conditioning Co., Div. of Graver Tank & Mfg. Co., Dept. CP, 216 W. 14th St., New York 11, N.Y. . . . or for more information check CP 6218 on handy form opposite last page.

**Reads low flow ranges  
with accuracy of 2%  
and fast response**

**Uses:** Designed for instantaneous direct readings of gas flow from 50 to 10,000 cc/min (about 1/3 cfm). Instrument may also be calibrated for measurement of mass flow in pounds of air or gas.

**Features:** Small electronic flowmeter has accuracy of 2% and response time of 0.5 second.

**Description:** Directly-heated thermocouple gage tube can be placed in line for low flow rates with no appreciable pressure drop in line. Unit can be used with extension cables for remote indications. Logarithmic calibration provides ease of reading in low flow ranges.

Indicator is housed in all-metal

## TWO-STAGE CONTROL

### TEMPERATURE OR PRESSURE

**Mercoid DA-400 Series Controls are dual purpose controls (available for pressure or temperature) incorporating a single element operating two separate independently adjustable Mercoid magnetic mercury switches. Circuit arrangements can be supplied for various operations, a few examples are:**

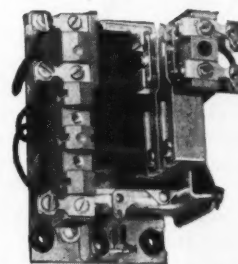
- 1 Close one alarm circuit at high setting and a separate circuit at low setting. Both circuits remain open between the high and low operating points of the two switches.
- 2 As an electrical interlock to open one circuit on a rise above, and the second circuit on a drop below the set operating point.
- 3 To provide two-stage control by opening one circuit on a rise and a second circuit on a further rise.

Pressure types available in 17 different operating ranges from 0-30" vac. to 300-2500 psi. Temperature types available in 11 operating ranges from -30-60°F. to 370-530°F.

WRITE FOR BULLETIN CA-PT

THE MERCROID CORPORATION, 4201 BELMONT AVE., CHICAGO, ILL.

When inquiring check CP 6219 opposite last page



● Write for latest catalog covering the complete line of B/W Induction Relays, Relay Enclosures, Contactors and Starters, Multiple Pump Controls, Electrode Holders, Starter and Relay Combinations, Special Controls and Panels.

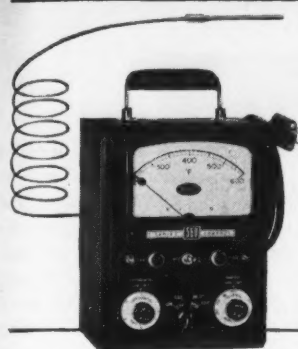
**B/W CONTROLLER CORPORATION**  
2204 E. Maple Road, Birmingham, Mich.

FIRST IN THE FLOATLESS CONTROL FIELD

When inquiring check CP 6220 opposite last page

CHEMICAL PROCESSING



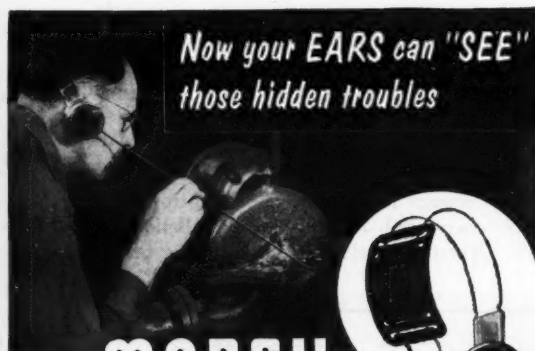


## Fenwal first to use thermistor in indicator- controller

The new Fenwal Series 560 Indicator-Controller is a revolutionary advancement in design and performance. Employing a super-sensitive thermistor, hermetically sealed in glass and enclosed in steel, the new instrument has many advantages that make it an outstanding value for both industrial or laboratory applications. The new sensing element not only probes temperatures from 200° to 600°F with closest accuracy; it also simplifies operation and maintenance by eliminating complex circuitry. And a selection switch permits either time-proportioning or on-off control, with accuracy to within 0.25% of full scale. For complete data on the Series 560, write for Bulletin MC123. Fenwal Incorporated, 244 Pleasant Street, Ashland, Mass.

**Fenwal** Controls Temperatures  
... *Precisely*

When inquiring check CP 6221 opposite last page



Now your EARS can "SEE"  
those hidden troubles

## NEW MARSH Serviceman Soundscope

... cuts servicing and maintenance costs

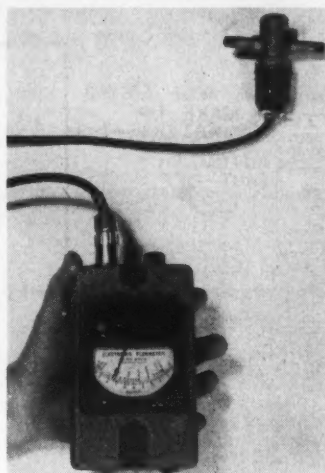
Most effective instrument ever developed for pin-pointing and identifying mechanical defects. Saves time and dollars tracking down troubles in bearings, gears, mechanisms . . . detects leaks, knocks, piston slaps—any defects that make a sound. A precision instrument of Marsh quality, sensitive to faintest sounds . . . with handy probe and headband as illustrated. A remarkable tool, moderately priced.

**MARSH INSTRUMENT CO.**  
Sole affiliate of Jas. P. Marsh Corporation  
Dept. Z, Skokie, Illinois

Ask  
for  
Circular

When inquiring check CP 6222 opposite last page

## INSTRUMENTATION



Flowmeter weighs only 27 ounces

case 3 1/2 x 5 1/2 x 2 1/2" and weighs 27 oz. Gage tube uses standard 1/8" IPS male thread.

(Electronic flowmeters are a product of Hico Instruments Div., Hastings Instrument Co., Dept. CP, Warwick 3, Va. . . or for more information check CP 6223 on handy form opposite last page.)

### Keeps cold junction of thermocouples at constant temp

Uses: For maintaining cold junction of thermocouples at constant temperature.

Features: Instrument is factory-adjusted for 150°F. Accuracy is 0.2°F.

Description: Unit is housed in steel case 12 x 8 x 7 1/2". Electrically-heated graphite oven has five cavities which are 5" deep and 0.343" ID. Each cavity holds several thermocouples. Proportional controller is connected with two resistance thermometer units embedded in oven and located close to heater windings.

(Cold junction thermostats are products of Weiller Instruments Corp., Dept. CP, 2 Stone St., New York 4, N. Y. . . or for more information reader may simply check CP 6224 on handy form opposite last page.)

## Push Button Quality Control

20,000 Batches  
a Year!



### Free Metering Data

Helpful booklet covers 150 industrial liquids, including water, syrup, liquid sugar, cocoa butter, coconut oil, chocolate, flavors, coffee, wine, alcohol, etc. Meters range from simple totalizers to Auto-Stops with electrical switch adaptations for controlling pumps, agitators, valves, etc. All have totalizing counters for accurate cost and inventory control. Ask for Bulletin 566-VP.

**NEPTUNE METER COMPANY**  
19 West 50th Street, New York 20, N. Y.

Branches in:  
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PORTLAND, ORE. • SAN FRANCISCO

In Canada: NEPTUNE METERS LTD., TORONTO 14, ONTARIO

When inquiring check CP 6225 opposite last page





## Specify Glasco METAL EQUIPMENT

► **EXPERIENCE** . . . Pioneers in the use of stainless steel, GLASCO have custom-fabricated metal equipment to meet the special requirements of the chemical processing industry for almost half a century.

► **FACILITIES** . . . With a large, modern plant occupying over 40,000 square feet of manufacturing space, plus the most efficient equipment, GLASCO are able to furnish any type of conventional equipment — or to custom-fabricate large, complex units for highly specialized use.

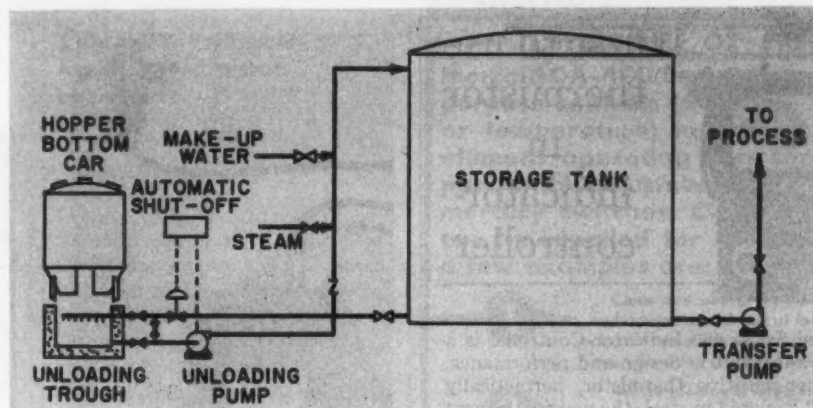
► **SERVICE** . . . The GLASCO Engineering Department is always ready to advise you or make recommendations regarding design, or assist in working out any equipment problems that may be brought to them.

*It will pay you to consult Glasco when you need metal handling equipment.*

Write for free folder "Metal Equipment for Processing of Chemicals and Pharmaceuticals".



When inquiring check CP 6226 opposite last page



Solution unloading and storage

## Bulk Soda Ash — *move it with pumps*

**Is tank storage of soda ash worth considering for your plant?**

**It probably IS if —**

- soda ash is used in solution
- inventory runs 75 to 300 tons (best size for solution storage)
- inventory runs 500 to 3000 tons (best size for slurry storage)

**It probably IS NOT if —**

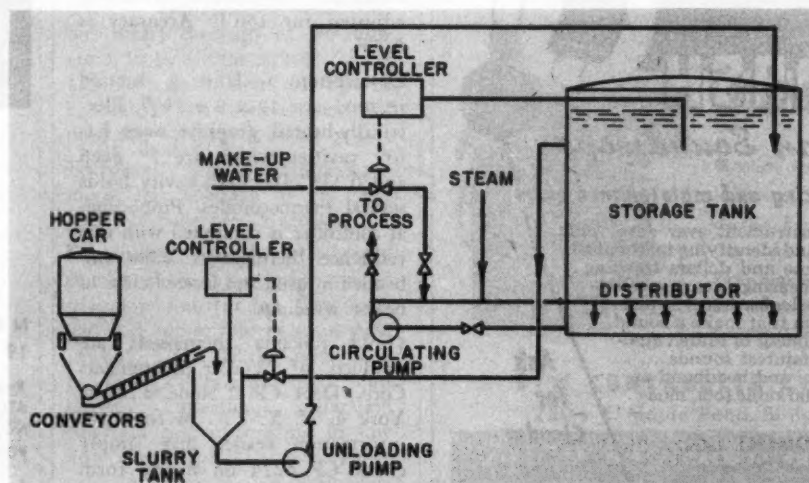
- soda ash must be used dry
- inventory is less than 75 tons
- inventory is so large that receiving is a "continuous" operation

**Many bulk users can save money and clean up receiving operations by switching to slurry or solution unloading and storage**

Chances are that plants using bulk soda ash use so much of it that unloading, storage, and handling costs are major items of expense. Bulk ash is supplied in two densities, about 35 and 70 pounds to the cubic foot; both have crystalline, free-flowing characteristics.

In figuring storage facilities, light grade soda ash will store dry at a density of five pounds to the gallon. Solution can be made to contain 3.5 pounds per gallon; slurries are practical at more than six pounds per gallon. These concentrated slurries settle to "produce clear saturated solution in a few hours. But storage is practical in either wet form.

"Wet" storage involves no special corrosion protection—plain steel is adequate. Installation cost is low. Operation is clean and simple.



Slurry unloading and storage

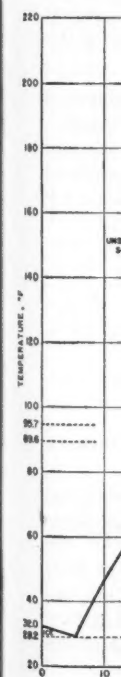
Solution Storage  
on size for  
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At 1000 gpa  
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Slurry Storage  
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500 to 3000  
000 to 1,000

Practical loa  
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through trou



Phase diag  
slurry (32%  
tion) soli



**Solution Storage**—While there is no practical limit on size for solution storage, it is recommended for inventories of 75 to 300 tons (one-and-one-half to six cars). Factors such as use of soda ash as a solution can make it desirable for smaller or larger quantities. Tank requirements for 75 tons would be about 50,000 gallons; for 300 tons about 200,000 gallons.

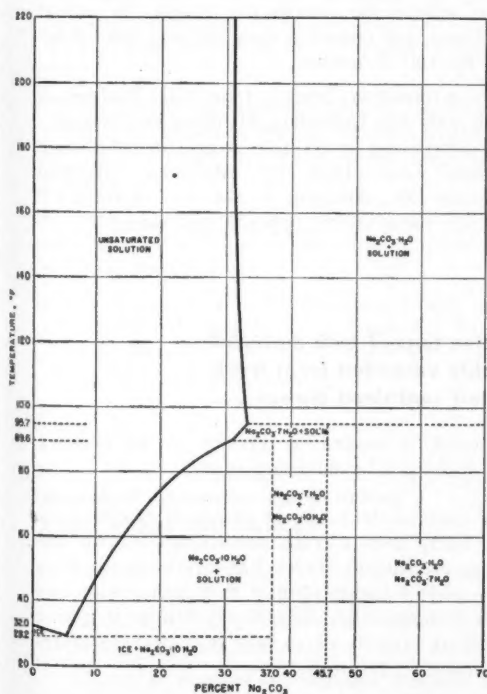
Simplest unloading procedure calls for dissolving ash in a trough installed below track level. Water or solution from tanks is circulated through trough. At 1000 gpm a 50 ton car is emptied in about two hours. Make up water can either be proportioned to solution stream or added at tank.

Piled ash seals opening of car hopper to cut dusting. Since heat of solution runs 140 Btu per gallon (at 3 lb/gal) only exceptionally cold water needs to be heated. Temperature rise is about 50°F.

**Slurry Storage**—Some small slurry installations are practical, but size range for best efficiency is from 500 to 3000 tons inventory. Tank capacity of 175,000 to 1,000,000 gallons is required.

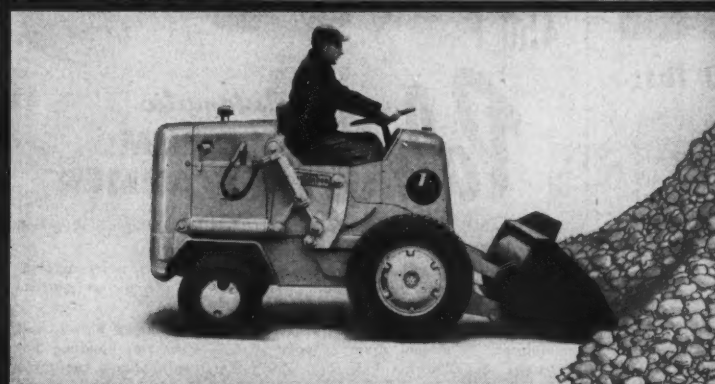
Practical loading arrangement uses a trough 20 feet long under tracks. Screw or drag conveyor moves ash through trough to a pit or tank where it is mixed

(Continued on next page)



Phase diagram of soda ash-water system. Note that slurry (32% sodium carbonate or higher concentration) solidifies if temperature drops below 95.7°F.

## A completely new and different **PAYLOADER®** TRACTOR SHOVEL



**PAYLOADER®**

MANUFACTURED BY  
THE FRANK G. HOUGH CO. • LIBERTYVILLE, ILL.  
SUBSIDIARY INTERNATIONAL HARVESTER COMPANY



## Powerful break-out digging action

Fast, efficient bucket-loading action of the new Model HA "PAYLOADER" begins when the machine moves forward and forces the 18 cu. ft. bucket into the pile with up to 3,100 pounds of push.

Twin, double-acting hydraulic rams, independent of the boom elevators, next rotate the bucket on its hinges... the cutting edge slices up through the pile in a powerful "break-out" digging action.

Bucket roll-back of 40° is now completed. The loaded bucket is close to the machine and low—only six inches off the ground—in a stable, sure position for safe, rapid transport at speeds up to 10 mph.

Your Hough Distributor is ready to demonstrate this completely new and different Model HA and what it can do.

Send complete information on the 1955 Model HA "PAYLOADER"

NAME \_\_\_\_\_  
TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_

When inquiring check CP 6227 opposite last page



## Scoops up, runs with 1200 lbs.

Jaeger Auto-Scoop steps up bulk handling as much as 20% per load. Its greater power (33 hp @ 1800 rpm) and sturdy construction easily move loads of 1200 lbs. Driven front wheels, at fulcrum of load, give maximum traction. Operator can tilt back bucket from ground level to loosen packed materials or to flip small loads into bucket. Many other time-saving features. Write for Catalog L12-4.

### JAEGER LOAD-PLUS auto-scoop



Low bucket tilt-back assists full-bucket loading, permits carrying as low as 4 1/2" from ground.



5" shorter turning radius (6'6"). Faster speeds to 13.88 mph in reverse, 7.66 forward.



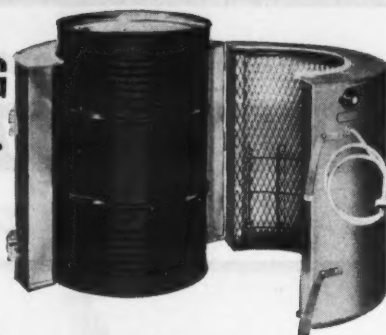
Higher clearance (6'8"), more reach (2'7").

1 cu. yd. Load-Plus available for bigger work.

THE JAEGER MACHINE CO., 616 Dublin Ave., Columbus 16, Ohio

When inquiring check CP 6228 opposite last page

WARMS  
ANYTHING  
IN METAL  
DRUMS  
UP TO  
450°F



## Palmer Automatic DRUM WARMER

A PORTABLE ELECTRIC OVEN in two models for 55 or for 30 gallon steel drums.

Saves Time—Saves Money. Makes removal from drum by dipping, pouring or pumping, easy and convenient, for any viscous material that handles better when warm.

Operates automatically and economically. Two hinged halves, well insulated, fit around drum at point of use—eliminates handling hot drums. Supplied for 115, 208, 230 or 460 volts, single, or three phase. Catalogue, prices and specifications on request. Write today!

HAROLD L. Palmer COMPANY

2980 West Davison Ave., Detroit 38, Michigan, Phone TULSA 3-1100

When inquiring check CP 6229 opposite last page

## MATERIAL HANDLING

(Continued from preceding page)

with clear saturated solution from top of storage tank. Slurry is pumped back to tank. Suspended particles settle continuously. Ash feed to slurring tank is usually controlled for a 4-5 lb/gal slurry. Solution rate to tank of 1000 gpm empties a 50-ton car in about two hours.

In order to maintain a supply of saturated solution, clear solution is withdrawn from top, mixed with water and redistributed into settled slurry. This water is added at the same rate as solution is withdrawn. Level in tank remains constant. If tank temperature drops below 95.7°F, contents of tank will solidify. Heating, however, melts heptahydrate which forms in slurry.

### Compare Dry Systems

When conventional dry conveyors and dry storage are used, dusting is one of the problems involved in unloading. Soda ash is an irritating, rather than dangerous, material in this way. Pneumatic conveyors reduce dusting problem. Power requirements are high: 3-5 hp/100 ft/ton/hr with travel limited to 200-300 feet if only vacuum is used. Vacuum plus pressure conveyors stretch this distance to 2000-3000 feet.

Fluidized pneumatic handling works well if travel is all downhill. Power requirements are lower than those of straight pneumatic conveying. Screw conveyors require 0.5-0.75 hp. Bucket elevator uses 0.2 hp on the same 100 ft/ton/hr basis. Belt conveyors seldom see enough use to pay for capital investment, but operating costs are very low—0.02-0.05 hp/100 ft/ton/hr.

(This information briefed from Olin-Mathieson's "Bulk Soda Ash Unloading, Handling and Storage". Full information is available from Olin Mathieson Chemical Corp., Dept. CP, Mathieson Industrial Chemicals Div., Baltimore 3, Md. . . . or check CP 6231 on handy form, opposite last page.)

### Twelve tons of bulk material quickly unloaded from truck by self contained blower . . .

truck is loaded by gravity in 10 minutes, discharged by fluidizing in 45

Bulk material deliveries of chemicals can be made in a hurry with a truck containing its own discharge mechanism. Truck has an aluminum alloy body 24 ft 6 inches long, 7 ft 5 inches wide and 11 ft 9 inches high. Capacity is 850 cu ft giving a holding capacity of 14 tons or a payload of approximately 12 1/2 tons.

Truck has three longitudinal hopper bays sloping to rear of wagon with a nine inch wide Aeroflow discharger at the bottom of each. Steep sides of



## LO-VEYORS FOR CONVEYING BULK MATERIALS AT LOW COST



### FEATURES:

- Self-contained, easy to install
- No belts, rollers or exposed bearings
- Open or covered pan and tubular types
- Wide variety of widths and lengths

Thousands in use

Convey dry aggregate materials by vibration

Sizes 5 microns to large lumps

Scalp, sort, wash, cool, dry

Conveys inflammable, corrosive, poisonous, abrasive or explosive materials



## LO-VEYORS

AJAX FLEXIBLE COUPLING CO. INC. WESTFIELD, N. Y.

Write for Bulletin 39

When inquiring check CP 6230 opposite last page





Twelve tons of material can be unloaded at point of use by truck having self contained blower discharge system. One man controls operation from panel in rear

these bays direct material on to discharger during unloading operation. Top of body is fitted with three loading hatches which have rubber seals to prevent air loss and keep material free from contamination. They have textile diaphragms to permit controlled escape of air displaced in loading.

Transverse collecting chute equipped with two short Aero-flow conveyors at rear of wagon receives material from main dischargers and feeds it into blowing seals which meter it into conveying air stream. Air supply is provided by positive-displacement blower. Air for elevating the material into hoppers is supplied by two stage blower. Rate of discharge is varied by adjustable simple air valve.

Operator controls discharge process from control panel fitted in rear of vehicle. Windows in control panel permit observation of interior of truck during unloading.

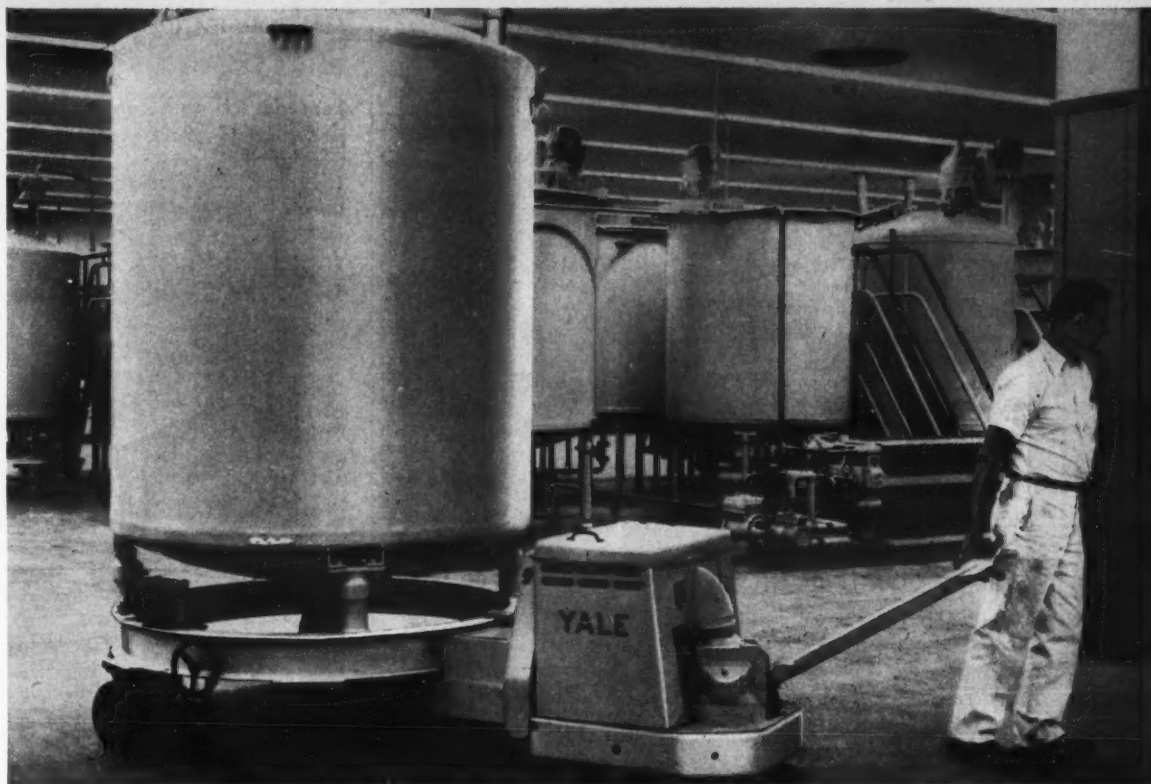
Loading of the truck by gravity takes place in about ten minutes and discharge of full load takes about 45 minutes.

(Bulk Wagon is a development of Henry Simon Ltd., Dept. CP, Cheadle Heath, Stockport, England . . . or for more information check CP 6232 on handy form opposite last page.)

#### Describes conveyors for handling bags, boxes and carboys

Bulletin of four pages describes heavy-duty flat belt conveyor for handling bagged or boxed materials. Belts with drive units, applications and photographs are included.

Bul 1554 is issued by Standard Products Div., Stephens-Adamson Mfg. Co., Dept. CP, 11 Ridgeway Ave., Aurora, Ill. When inquiring specify CP 6233 on handy form opposite last page.



## Full 1,000 gal. tank gets smooth ride on Yale Worksaver

OTHER YALE TRUCKS HANDLE MANY MATERIALS FOR CHEMICAL PROCESSING PLANTS

This YALE platform-type *Worksaver* handles loads up to 7500 lbs. with smooth, easy power. It's a small, lightweight, maneuverable electric truck that does big-truck work in speeding the movement of heavy loads throughout chemical processing plants. Other YALE *Worksavers* are available in telescopic fork, pallet-handling and tractor models for fast, efficient handling in limited spaces and over low-load flooring.

YALE's complete line of Gas, Electric and Diesel Trucks and use-extending attachments meets every handling need of chemical processing plants. You can select exactly the equipment you require for your needs in handling everything from raw materials through finished products. Standout YALE features assure faster, safer, smoother handling—with maximum handling economies. Send coupon today for detailed information.

# YALE<sup>®</sup> INDUSTRIAL LIFT TRUCKS AND HOISTS

\*Reg. U. S. Pat. Off.

Gas, Electric, Diesel & LP-Gas Industrial Trucks • Worksavers  
Warehouses • Hand Trucks • Hand & Electric Hoists

MAIL THIS COUPON TODAY

The YALE & TOWNE Manufacturing Co., Dept. 124  
Roosevelt Boulevard, Philadelphia 15, Penna.

Please send me full information about YALE

☐ Gas Trucks ☐ Electric Trucks ☐ Worksavers  
☐ Hand Trucks ☐ Attachments

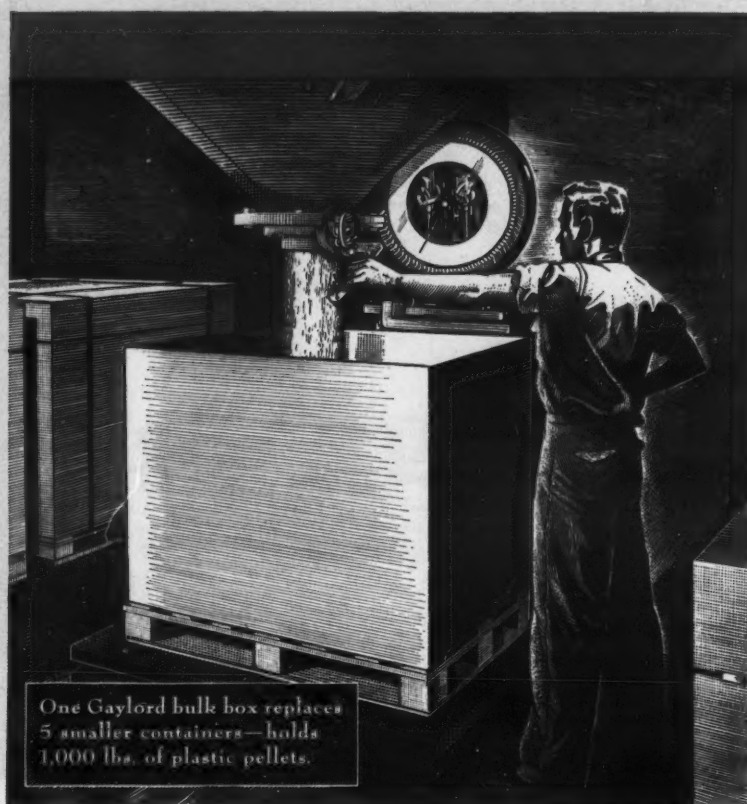
Company \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

Street \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

In Canada write: The Yale & Towne Manufacturing Co.  
St. Catharines, Ontario, Canada

When inquiring check CP 6234 opposite last page



One Gaylord bulk box replaces 5 smaller containers—holds 1,000 lbs. of plastic pellets.

## SIMPLE ARITHMETIC IN PACKING

*When one large box does the work of several smaller ones . . . it adds up to savings in many directions. You pack your product faster, handle it more efficiently and store it in less space.*

*"King-size" Gaylord boxes are designed to hold as much as 2,000 pounds of such diverse products as bulk chemicals, metal parts, wax, and brake linings. The list is constantly growing. Your product could be next.*

*For information call your nearby Gaylord sales office or visit Gaylord Booth 805 at the National Packaging Exposition, Chicago, April 18-21.*



CORRUGATED AND SOLID FIBRE BOXES  
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES  
KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION • ST. LOUIS

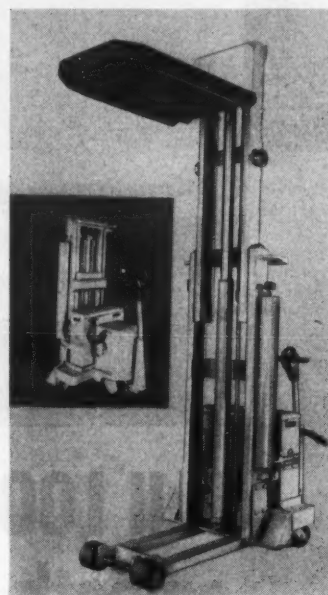
SALES OFFICES FROM COAST TO COAST ★ CONSULT YOUR LOCAL PHONE BOOK

## MATERIAL HANDLING

### Ten-foot lifting heights provided by truck

Hand motorized platform trucks having capacities of 2000 and 3000 lb provide good lifting power in small areas.

Mast assembly is telescopic with roller construction having lifts of



60, 108 and 120 inches. Platform is 7" lowered height minimum and 24 and 26" wide.

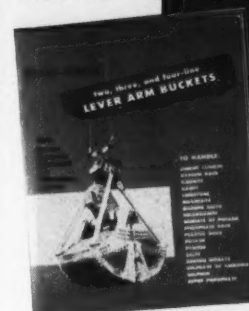
(KHW Platform Truck is a product of Lift Trucks, Inc., Dept. CP, 2423 Spring Grove Ave., Cincinnati 14, O. Check CP 6235 opposite last page.)

### Gives precise flow control of liquid chemicals

**Uses:** To regulate flow in any situation in which it is necessary to feed liquid chemicals.

**Features:** Unit has high degree of adjustability in timing arrangements. Total time cycle, that of the chemical fed, and length of non-feeding time can be set so that they will proceed automatically until chemical supply is exhausted or a new setting is decided upon.

## How to PREVENT CONTAMINATION in your MATERIALS HANDLING OPERATIONS



### Send for This Bulletin about BLAW-KNOX TIGHT-LIP BUCKETS

BULLETIN 2378 tells how the "tight-lip" construction of Blaw-Knox Chemical and Fertilizer Buckets prevents costly contamination caused by leakage of granular fines.

Blaw-Knox Buckets are designed with proper distribution of weight for maximum performance based on many years of intimate experience in the handling of various bulk materials in the chemical and fertilizer fields.

The wide range of available models permits a selection of the proper size, weight and type bucket to fit your installation requirements and obtain peak performance. Write for Bulletin 2378 today!

BLAW-KNOX COMPANY  
CONSTRUCTION EQUIPMENT DIVISION  
Pittsburgh 38, Pa. • Offices in Principal Cities



BLAW-KNOX CLAMSHELL BUCKETS  
for the Chemical Industry

When inquiring check CP 6236 opposite last page

## LIGHT BUT SO STRONG!

TOTELINE  
FIBERGLASS  
TRAYS

For Drying:  
CHEMICALS  
PHARMACEUTICALS  
ANTIBIOTICS

They're feather-light, but they're durable and sturdy as any trays you've ever used! What's more, the large inside corner radii makes them very easy to clean. And, because fiberglass does not absorb heat, the materials dry faster in Toteline trays. Many sizes available. Write

TOTELINE  
Wherever  
materials  
are handled



MOLDED FIBERGLASS TRAY CO.

World's largest producer of Fiberglass reinforced resin Trays, Tote Boxes

LINESVILLE, PENNSYLVANIA

When inquiring check CP 6237 opposite last page

CHEMICAL PROCESSING



CONSULT FOR THE BEST  
**PS Materials HANDLING EQUIPMENT**

**DRUM AND BARREL SLING**  
Item B-305  
Loading and unloading trucks and for general purpose handling. Pick up drums from lying position and set on end. Handles drums, barrels, kegs—anything with a lip. Half-ton capacity. Weight app. 8½ lbs.

**DRUM and BARREL TILT**  
Item B-731 \$181.50  
A barrel tilt for controlled, precision dumping or pouring. Ideal for chemicals, solvents, powders, etc. Turns 360° through worm drive. Equipped with two safety type locking devices and all-steel, welded yoke. Hand-operated chain drive.

**Combination TRUCK and DRAIN RACK**  
Loads Automatically  
Moves barrels or drums, also serves as drain rack. Two styles—with or without detachable handles. Sturdy frame-welded construction. Weight approximately 90 lbs.  
Item NS-506 \$46.75  
(Handles welded to frame)  
Item NS-506 DH \$48.95  
(Detachable handles)

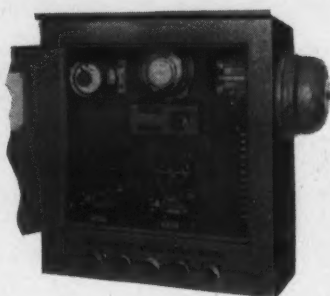
**BARREL and BOX SKID**  
All-Steel  
This new skid, although much lighter in weight and easier to handle than the old fashioned, clumsy wood skids, is made entirely of steel, welded construction and will out-last any wooden skid that was ever made. Will stand up under the heaviest barrel or box. Skid measures 14" wide overall. Attractively priced.

**Item B-470 from \$24.20**

WHEN ORDERING always specify "Item" number. All prices are f.o.b. Detroit. Prices are subject to change without notice.

DESIGNED AND MANUFACTURED BY  
**Palmer Shile Co.**  
14016 FULLERTON AVE. DETROIT 27, MICH.

## MATERIAL HANDLING



Chemical feed control unit

In a typical arrangement, total cycle might be one hour, chemical might be pumped for fifteen minutes, another chemical or a water rinse for the same interval, and shut-off period would be half an hour.

**Description:** Chemical feed control combines precise control with liquid level alarm. Liquid level alarms consist of electric probe in tank which rings bell when liquid falls below probe. Alarm is then silenced but alarm light remains lit until tank is refilled. To identify low tank, operator checks which light is lit on control box — one light corresponds to each tank. When tank is filled light goes out and another bell sounds, notifying operator who then resets alarm.

(Feed Control Unit is a product of Graver Water Conditioning Co., Div. of Graver Tank & Mfg. Co., Inc., Dept. CP, 216 West 14th St., New York 11, N. Y. Check CP 6239 opp. last page.)

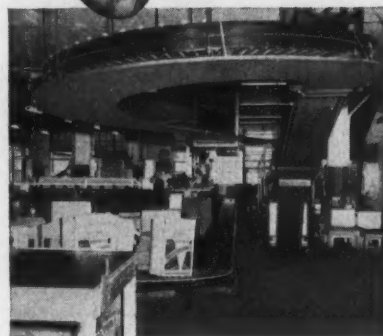
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"THAT'S INTERESTING"

Picture windows  
weigh 12 tons

The world's heaviest glass windows, made that way with lead, have been successfully cast by Corning Glass Works. These windows, some of which are six feet thick and weigh 12 tons, are almost as dense as steel and will be used to fend radiation from employees working on experiments in research and development of an atom-powered airplane. (Lead, 19, 6)

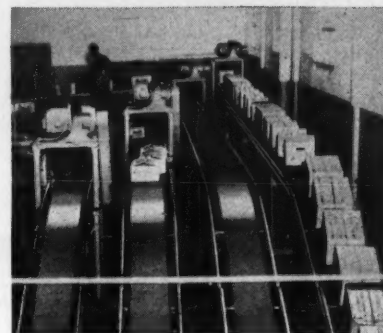
**Want to move things**  
**up** ↗



For lifting or lowering —  
floor-to-floor —  
the **INCLINEBELT**

Continuous package conveying — a complete belt conveyor system or the Inclinebelt—complete, compact easy-to-install, electric-motor powered unit. High, continuous-line load capacity for any floor elevation. Available in belt widths of 8-12-14-18-24-30 and 36 inches.

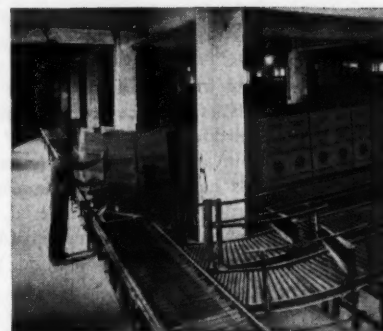
**down** ↘



For inclined or horizontal  
conveying —  
the **UTILITY BELT-VEYOR**

Conveys from floor-to-floor. Moves "packages" down, up or horizontally. Electric motor powered. Installs over existing stairways, or can be used as a portable Levelbelt conveyor. Four standard belt widths: 10-14-20 and 24 inch.

or  
**horizontally?** →



For straight line  
or inclined conveying —  
assemble your own system  
or portable conveyor using  
**HANDI-DRIVE** pre-built units

These stock, pre-built conveyor units make it easy to assemble what you want in a conveyor. Converts existing gravity conveyor to power conveyor — quickly and at low cost. Can be installed as single portable unit or complete system.

**Standard builds conveyors to  
speed any ONE or all THREE**

Call your Standard representative listed in your classified phone book or send for illustrated Standard General Catalog describing all three units — address Dept. CP-45.

**STANDARD CONVEYOR COMPANY**  
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**Standard**

**GRAVITY & POWER Conveyors**  
ROLLER • SLAT • WHEEL  
SECTIONAL • BELT • CHAIN • PUSH-BAR

**PORTABLE CONVEYOR UNITS:**  
HANDIBELT • INCLINEBELT • EXTENDOVEYOR • UTILITY BELT-VEYOR  
HANDIPILER • LEVEL BELT • LITWATE • HANDIDRIVE  
PNEUMATIC TUBE SYSTEMS

When inquiring check CP 6240 opposite last page

When inquiring check CP 6238 opposite last page  
APRIL, 1955

# this line leads to low-cost materials handling



Unloading materials at Merck & Co., Inc. with "Airstream" Conveyor

This is the "business end" of a Dracco Airstream Conveyor.

Using a single intake nozzle, the one-man operator unloads box or hopper cars as fast as a four-man crew could manually. The materials being unloaded are grains and oystershell meal—receiving them in bulk produces savings in material and labor costs.

These materials are moved to storage at the St. Louis feed supplement plant of Merck & Co., Inc. through the "Airstream" conveying line . . . and it literally leads to low-cost materials handling.

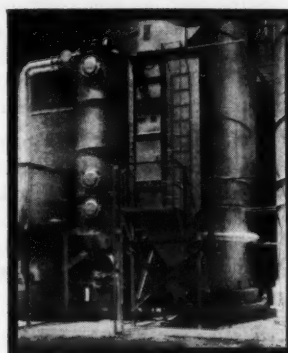
Merck, long a major producer of fine chemicals, uses the grains and oystershell meal as carriers in animal feed supplements whose active ingredients are vitamins and antibiotics. In addition to labor and material savings, the Dracco instal-

lation provides dust-free handling with a completely enclosed, sanitary system. There is no loss or contamination of materials.

In any industry wherever dry bulk materials are used, the pattern is repeated—the introduction of "Airstream" Conveyors invariably leads to lower-cost materials handling. If you handle any granular or powdered material, why not follow Merck's lead and investigate the Dracco "Airstream" method. Write or call:

**DRACCO CORPORATION**  
4070 East 116th Street • Cleveland 5, Ohio

Want further information on bulk materials handling with "Airstream" Conveyors? Write today for 24-page Bulletin 529.



Pneumatic unloading line at Merck plant leads to Dracco equipment occupying only 300 sq. ft. of space. Materials are rushed to this point by suction, then blown into storage tanks at 6 tons per hour.

## MATERIAL HANDLING

### Mobile warehouse moves by truck or rail . . .

container becomes storage structure for contents following delivery of goods

Flexible shipping is a feature of a system of material handling recently developed. Using a lightweight van 17 feet long, 8 feet wide and 8 feet high, goods



Straddle carrier shown above is loading van on truck for delivery to plant

can be transported by rail or freight or both, then put on a flatbed truck for local delivery. When vans arrive at destination they can be used as a storage container until contents are needed.

Three vans can be loaded on a standard flat-car, two on a 35 ft highway trailer. Merchandise is loaded at shipper's loading dock and vans handled by fork



Fork truck loading van onto freight car. Standard freight car will handle three of the vans

truck or straddle carriers. Each van weighs 3000 pounds when empty and has a capacity of 20,000 pounds.

(Mobilvan System is a development of Clark Equipment Co., Industrial Truck Division, Dept. CP, Battle Creek, Mich. . . . or for more information check CP 6242 on the convenient Reader Service slip located opposite last page.)

Two-ton  
folds into  
16" high

permit  
nesting

Uses:  
and shipping

Features:  
when open



either case  
between c  
to be han

Description  
in two size  
32 x 40 x  
to 15-3/4"  
4000 lb.

All panels  
replaceable



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# DRACCO

*Performance Proved*  
**Airstream CONVEYORS • DUST CONTROL EQUIPMENT**

When inquiring check CP 6241 opposite last page



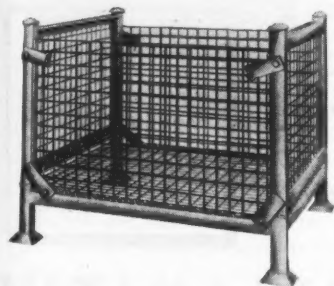
## MATERIAL HANDLING

**Two-ton capacity box  
folds into unit  
16" high . . .**

permits tiering when loaded,  
nesting when empty

**Uses:** For material handling  
and shipping.

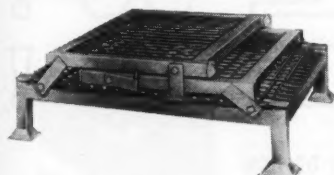
**Features:** Units can be tiered  
when open or knocked down. In



either case, clearance of two inches  
between containers permits them  
to be handled by fork truck.

**Description:** Container comes  
in two sizes — 40 x 48 x 24" and  
32 x 40 x 24". Both knock down  
to 15-3/4" and have capacity of  
4000 lb.

All panels of the container are  
replaceable. When nesting for



storage or return shipment tier of  
8 makes a stack 18 1/2" high. Square  
legs on unit provide solid support  
when tiering.

(Pyramid Box is a product of  
Paltier Corp., Dept. CP, 1701  
Kentucky St., Michigan City, Ind.  
. . . or for more information reader  
may simply check CP 6243 on  
the convenient Reader Service slip  
located opposite last page.)

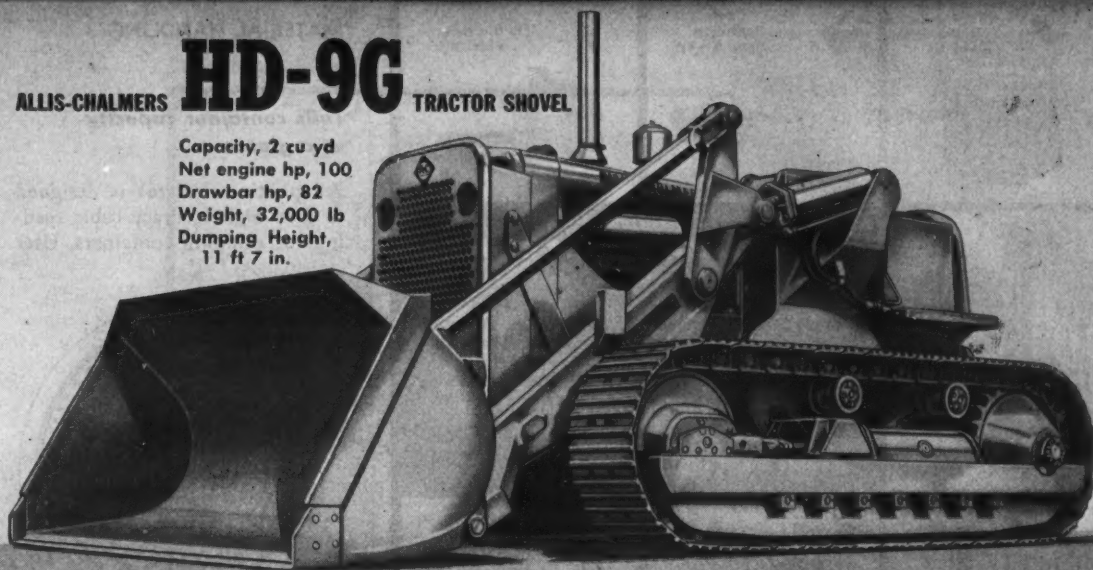
For more information on product  
at right, specify CP 6244  
. . . see information request  
blank opposite last page.

ALLIS-CHALMERS

# HD-9G

TRACTOR SHOVEL

Capacity, 2 cu yd  
Net engine hp, 100  
Drawbar hp, 82  
Weight, 32,000 lb  
Dumping Height,  
11 ft 7 in.

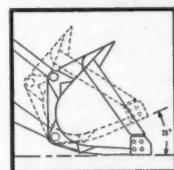


## POPULAR 2-YD HD-9G TRACTOR SHOVEL NOW OFFERS

### Higher Work Capacity

Design refinements in the Allis-Chalmers HD-9G now make it even more productive than ever. First, the net engine output has been increased to 100 hp, with 23,000 lb of push for extra crowding and digging ability, fast work cycles.

Streamlined bucket design now helps roll in large loads with less tractor effort. The back of the bucket has been brought forward and the sides extended to cut spillage, put more pay load where it's wanted. Cleaner dumping with the new bucket saves the operator time and effort shaking out loads.



A new addition to the wide variety of attachments available for the HD-9G Tractor Shovel is the Tip-Back bucket which allows the operator to roll the bucket back approximately 25° at ground level. Ideal for handling greater capacities of loose stockpiled materials, the Tip-Back bucket can be carried lower to the ground for greater stability . . . can load bulky objects easier.

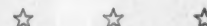
New-type ceramic master clutch lining reduces lever pull, makes it easier for the operator to do more. The new HD-9G helps the operator do more in other ways, too — giving him full vision, fast and easy control, cleaner platform and more comfortable seat from which to work, and more working time with truck wheels, support rollers and idlers that need greasing only once every 1,000 hours.

### Lower Operating Cost

Design improvements also add longer life to the HD-9G under all work conditions. Heavy box-section booms are 50 percent stronger, assuring proper alignment even working in the toughest materials. The low design of the new HD-9G combination stabilizer and cowl not only offers easy accessibility for maintenance and service, but contributes to maximum operator vision. New ceramic master clutch lining operates longer between adjustments, increases clutch life.

Hydraulic system provides new maintenance simplicity, safety of operation, as well as improved visibility. With new-style tank, there are few external fittings, greatly reducing possibility of outside leaks. Magnetic filters and suction-line screens protect the entire system from damaging grit. New, improved hydraulic pump is designed for long life as well as fast and accurate bucket action.

Heavy-duty truck wheels and idlers are available for particularly tough working conditions. One-piece, full-length main frame permits unit construction so that major assemblies can be removed without disturbing adjacent units, putting tractor back on the job in hours rather than days.



See your Allis-Chalmers dealer for further information on what the HD-9G can do for you — or a demonstration right on your job.

# ALLIS-CHALMERS

TRACTOR DIVISION — MILWAUKEE 1, U. S. A.



Tractor  
Model KT



Platform  
Model KN-KW



Tin Plate  
Model KTP



High Lift—Model KHL



Ridertractor—Model KTR



Pallet—Model KPN-KPW



Tongue Lift—Model KTL



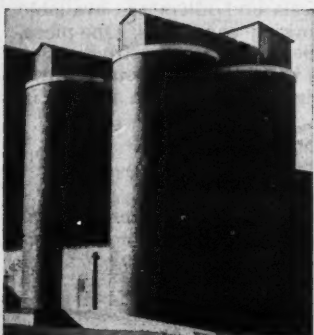
## LIFT TRUCKS

INCORPORATED

2423-31 SPRING GROVE AVE.  
CINCINNATI 14, OHIO

When inquiring check CP 6245 opposite last page

**SEE HOW YOU'LL  
SAVE BY STORING  
BULK MATERIALS  
THIS MODERN WAY**





**Get your copy of  
Kalamazoo Bulletin 1153-B.  
Write today.**

INDUSTRIAL STORAGE BIN DIVISION

## Kalamazoo TANK and SILO COMPANY

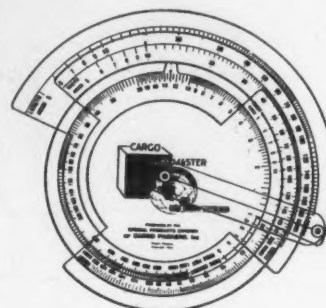
445 HARRISON STREET • KALAMAZOO, MICHIGAN

When inquiring check CP 6246 opposite last page

## MATERIAL HANDLING

**Tells container capacity  
at a glance**

All plastic calculator is designed to give high accuracy cubic readings of shipping containers. User



Gives cubic feet capacity of containers in a jiffy

merely lines up length, width, and height scales and correct answer is given in cubic feet. Scales are large, clear, and easy to read.

(Cube Master is a product of Cargo Packers Special Products Co., Dept. CP, 73 Rutledge St., Brooklyn 11, N. Y. . . . or for more information check CP 6247 opposite last page.)

### Handling bulk materials with scraper hoists

Comprehensive catalog of 44 pages describes line of air and electrical scraper hoists. Outstanding features of each type and size are carefully outlined with specifications, capacity sizes, symbols, and accessories available. Many applications are illustrated as well as a variety of operations. Full descriptions of two types of remote controlled units, throttle equipment and several types of brakes, all for double or triple drum hoists, are accompanied by photographs.

Bul 5300-A is available from Ingersoll-Rand Co., Dept. CP, 11 Broadway, New York 4, New York. When inquiring specify CP 6248 on handy form which is located opposite last page.

## New Line of STAINLESS STEEL PAILS at Big Savings!



**New Welded Construction Equals  
Seamless or Spun**

Entirely stainless (no solder) — smooth surfaces — sturdy 24 gauge type 304 analysis stainless — improved shape for easier carrying, better balance — handles, ears, chimes of heavy-duty stainless. Outstanding quality at lowest cost. Backed by Metalsmiths' 30 years' serving process industries.

**SEND YOUR ORDER TODAY  
PROMPT SHIPMENT**

### LOWEST PRICES — BIGGEST SELECTION ON THE MARKET

10 qt. -	\$ 9.25 ea.
12 qt. -	10.25 ea.
14 qt. -	11.25 ea.
16 qt. -	12.25 ea.
20 qt. -	13.50 ea.

*Discounts in quantity*

**METALSMITHS**  
Division of Orange Roller Bearing Co., Inc.  
556 White Street Orange, N. J.

When inquiring check CP 6249 opposite last page

NEW!  
NEW!  
NEW!

**Up-to-date facts on new  
Tri-Forged welded and  
Tri-Lok interlocked  
grating and stair treads**



Here's vital information for ready reference on the new Tri-Forged steel grating and stair treads, plus latest information on Tri-Lok interlocked products. This fact-filled catalog gives you installation specifications, types of grating and stair treads available, and safe load tables. Be sure to write for your copy today.

**For your free copy  
write department D-2704**



**DRAVO**  
CORPORATION  
Pittsburgh 22, Penna.  
National Distributors

When inquiring check CP 6250 opposite last page

CHEMICAL PROCESSING



## MATERIAL HANDLING

Figures magnified 28 times  
for easy reading of loads



Figures are easy to read

Weighing unit features projecting type of weight indication. Weight is flashed on a large wide angle screen for easy reading.

Scale uses an optical projection of a microfilm which is precisely graduated. Enlargement is 28 times the size of original and is flashed on a screen which is unaffected by outside sunlight.

Models are available in gross capacities from 31 to 2400 lb. There are two models: the short bench style, and the tall column floor style. Both are finished in baked Hammerloid light blue-gray finish with chrome trim.

(Weightograph Scale is a product of Howe Scale Co., Inc., Dept. CP, Rutland, Vermont . . . or for more information on this product reader may simply check CP 6251 on convenient Reader Service slip located opposite last page.)

### Compares cranes of many sizes

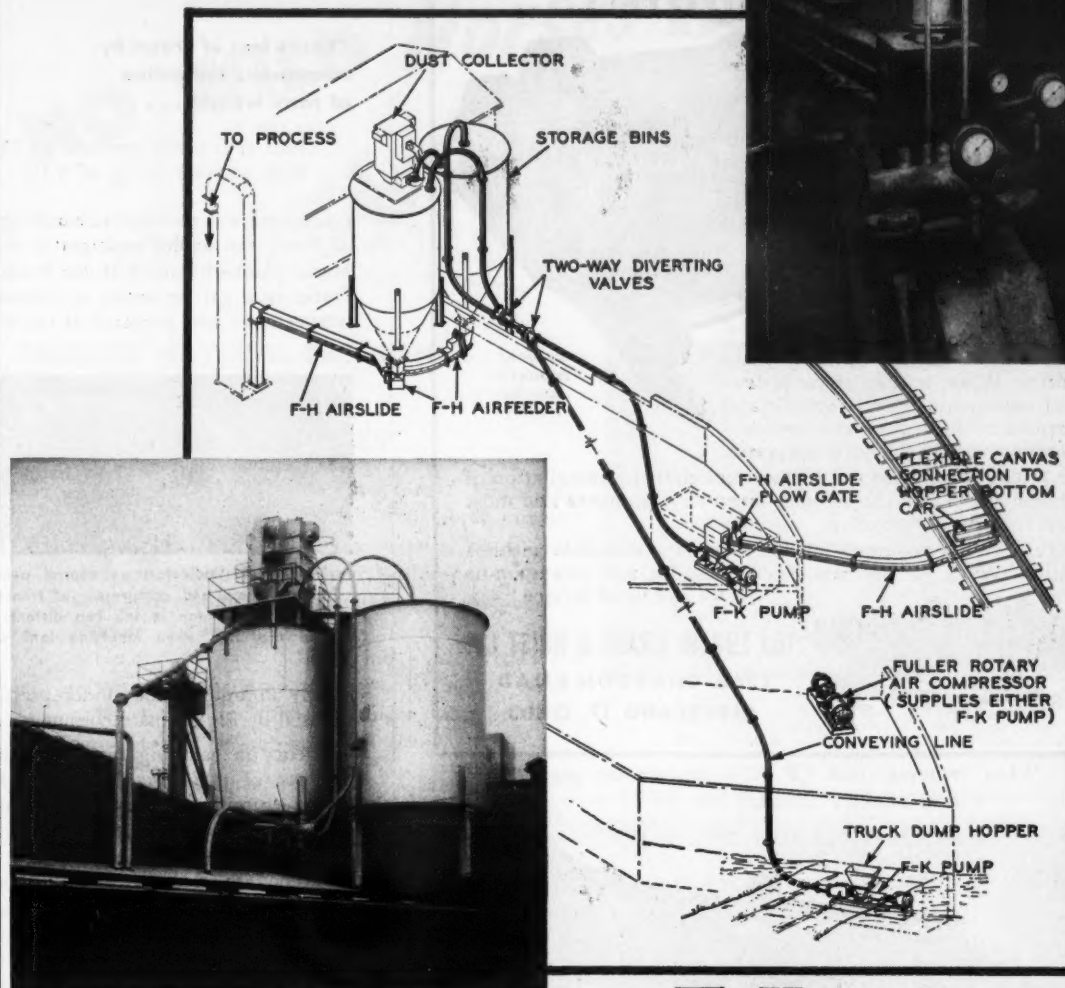
Illustrated 28-page book shows all details of cranes ranging in capacity from 1 to 100 tons. Standard components are pictured and explained. Various methods of design are compared. Auxiliary equipment is also included.

Two-page table of data allows engineer to find dimensions, weight, load, and type of construction for cranes from 5 to 75 tons.

"Euclid Cranes" is issued by The Euclid Crane & Hoist Co., Dept. CP, 1368 Chardon Rd., Cleveland 17, Ohio. When inquiring specify CP 6252 on convenient Reader Service slip located opposite last page.

### Does your plant need modern material handling methods . . . ?

check the handy Product Directory (pages 237 to 240) for a quick reference to ideas and equipment in this issue.



## Certain-teed makes certain with Fuller ... Unloading and conveying system pays off

A few years ago, Certain-teed Products Corporation decided to find, if possible, more economical methods of operation in its York, Pa. plant. One problem given serious consideration was the handling of incoming limestone and slate filler dust received in bags, requiring costly, manual labor, resulting in breakage of bags with consequent loss of material and a dusty condition in the plant.

Together, Certain-teed and Fuller engineers made studies of their layout and came up with a solution—a combination of the Fuller-Kinyon Conveying System and F-H Airslides.

Two Fuller-Kinyon Pumps are used. One conveys limestone dust from hopper-bottom cars, utilizing the Airslide to convey from cars to the pump located in a pit in the plant. This pump conveys to either one of the two storage bins . . . efficient, clean, rapid transfer from cars to storage. The other pump handles the

slate dust, delivered in trucks, also conveying to storage. Withdrawal of either material from storage bins is accomplished with Airslides, which discharge to an elevator delivering to process.

Air for the pumps is supplied by a Fuller Rotary Single-stage Compressor, having a capacity of 482 c.f.m. at 20-lb. pressure. Low-pressure air, for the Airslides, is supplied by a small blower.

It is reported that the savings realized by the use of this Fuller system has paid for the installation in less than two years of operation.

Possibly your materials handling is antiquated and costly, which could be remedied by a comparatively small investment. Why not find out . . . have a Fuller engineer study your operation and submit a report . . . it will cost you nothing, nor obligate you in any way.

**FULLER COMPANY**  
Catasauqua, Pa.

Branch offices: Chicago—San Francisco—Los Angeles—Seattle—Birmingham

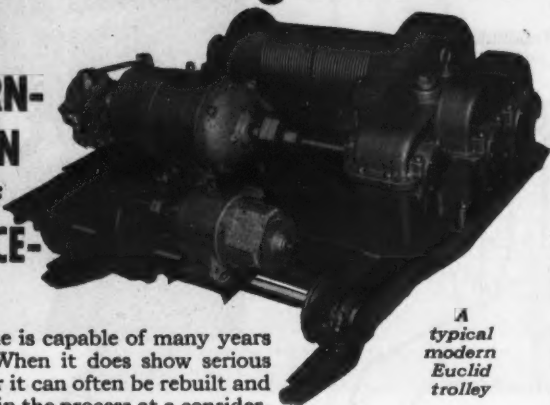
G-39  
1157

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS . . . PREHEATERS . . . COMPRESSORS AND VACUUM PUMPS . . . FEEDERS

When inquiring check CP 6253 opposite last page

**'ever Investigate?...**

**CRANE  
MODERN-  
IZATION  
INSTEAD OF  
REPLACE-  
MENT**



A  
typical  
modern  
Euclid  
trolley

A good crane is capable of many years of service. When it does show serious signs of wear it can often be rebuilt and modernized in the process at a considerable saving under the price of a new crane.

Crane bridges rarely require replacement and the installation of a new trolley can provide the very latest developments and most efficient features of operation.

The advice of our engineers in such matters is available without obligation. Write for the new Euclid Catalog and call upon us if we can be of service.



**The EUCLID CRANE & HOIST Co.**

**1368 CHARDON ROAD  
CLEVELAND 17, OHIO**

When inquiring check CP 6254 opposite last page



**Look at the load carried by these four NEFF & FRY Bins**

All of the bridgework, with machinery, atop these bins is carried by the silos themselves without extra supports. What's more, the four bins, if filled, can hold about 3,000 tons of coal.

This strikingly proves the load-bearing strength of NEFF & FRY storage bins, which is due to the design and stamina of the Super-Concrete Staves in the walls.

Our bins are used in the industrial areas of North America for handling and storing a great variety of flowable bulk materials, the most frequent being alumina, cement, clay, coal, ore, lime, grain, sand, and wood chips.

The facts about NEFF & FRY bins are briefly told in our interesting folder, "Bins With the Strength of Pillars." A copy is yours for the asking without obligation.

**THE NEFF & FRY CO. • 166 Elm St., • Camden, Ohio**

*Not exported except to Canada and Mexico.*

**SUPER-CONCRETE STAVE STORAGE BINS**

When inquiring check CP 6255 opposite last page

**MATERIAL HANDLING**

**Checks loss of Freon by  
continuous indication  
of tank weight...**

load cells check contents of 15,000 gal tanks with accuracy of 1/2 of 0.1%

Guesswork was removed in handling large volumes of Freon for aerosol packages at the Easthampton, Mass., plant of Stanley Home Products, Inc. Since Freon is a gas or vapor at normal atmospheric temperatures and pressures it has to be contained



Two weight indicators on control panel for motor-driven pump and compressor at trackside show the quantity of Freon in the two distant storage tanks and are used when emptying tank cars of Freon

largely in liquid form under pressure until it is released by the ultimate consumer.

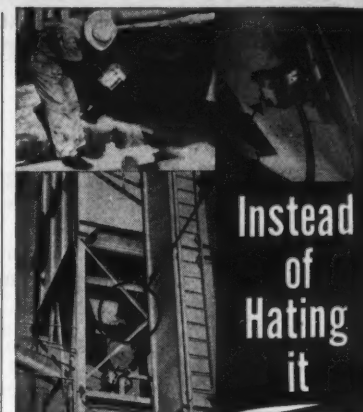
Efficiency in handling large volumes of Freon in and out of two storage tanks without loss presented a problem. When running a single mechanized production line at maximum rated capacity continuously for a week, more than 15,000 gallons of Freon are used. This requires unloading two or three 6000-gallon tank cars. In using such large quantities of Freon, leakage and evaporation losses can be high unless unusual precautions are taken in unloading, in feeding production lines, and in guarding against system leaks.

Adequate precautions require constant record of stored and used quantities of Freon. Such records show whether there are losses during periods when no Freon is being withdrawn, and check extent



Strip-chart recorders show the rate of consumption of Freon. Conveyors carry filled cans to capping machines, shown in front of the recorders. Freon storage tanks are on the other side of the building wall

of evaporation losses in filling operation. Weight is only satisfactory measure of stored quantities because it is not affected by variations in pressure and temperature.



**Instead  
of  
Hating  
it**

**Start  
Vibrating It!!**

... With Cleveland Air vibrators, like the Type LSRR and F, shown at work here-with.

It's easy to just get mad and say what's the use, but it's a lot easier to let these twins shake it loose.

They are double trouble-makers for your double-tough materials. They're doing a round-the-clock job in a lot of plants like yours.

The LSRR is equipped with a cast steel male bracket which fits the female bracket that is standard equipment on most covered hopper railroad cars. Easily adapted to hoppers, bins, chutes, flasks, mine cars, etc.

The F is made in six sizes for bins containing from one to several hundred tons. The F will call a halt immediately to arching, plugging, and sticking. As shown, simply mount the vibrator on the skin of the bin, using a reinforcing plate. Type JN lever-type valve and automatic lubricator insure efficiency.

ask for Catalogue 109



**2706 Clinton Ave. • Cleveland 13, Ohio**

When inquiring check CP 6256 opposite last page

**CHEMICAL PROCESSING**

Glass s  
two cyl  
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proxima

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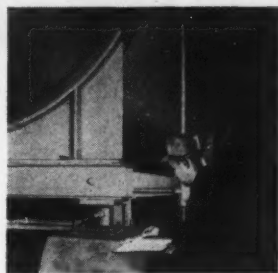
To fill  
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(SR-4 L  
Lima-Ha  
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formation  
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**APRIL,**



Glass sight-gages, provided on the ends of the two cylindrical tanks, give only a rough check on the amount of Freon because volumes in the liquid and vapor phases vary widely with the quantity in the tank and its temperature.



Load cells of 50,000-lb capacity each support one end of this 40-ft long, 8-ft diameter tank of Freon, and act as weight transducers in measuring the quantity of Freon available for use

Continuous weighing of the two tanks, which may weigh as much as 200,000 lb each, was greatly simplified by the use of two small compression load cells of 50,000 lb capacity as supporting members on concrete base at one end of each tank. With these two cells, the load is measured electrically through simple amplifying electronic circuits.

By leveling the 40-ft long, 8-ft diameter tanks, the two cells support exactly half of the load.

Instruments are calibrated to read only weight of the Freon in tanks. Weight of tank and supporting structure are zeroed out. Effects of connecting piping on weighing accuracy are eliminated by use of reinforced flexible hose at both inlet and outlet. Accuracy in weighing is within  $\frac{1}{2}$  of one percent.

Instrumentation provides for weight indications at three points. One is at the can filling position on production line. At this point are two Baldwin strip-chart recorders with 1000-lb divisions (approximately 85 gallons per division.)

Two indicating instruments with 5000-lb division are located on the outside of the same wall at a point between the two tanks. Two identical indicating instruments are located at tank car siding. Motor-driven pump at this location shuts down automatically when a weight corresponding to 13,500 gallons of Freon is in tank. Tanks are never completely filled.

To fill pressurized cans Stanley Home Products, Inc. has one of the fastest mechanized production lines of its type in the United States. Cans can be filled with 10.2 oz of Freon chilled to  $-30^{\circ}\text{F}$  and sealed at the rate of 120 per minute. Since the can is sealed within a few seconds after filling, evaporation loss is quite small. At this rate Freon is taken from the tank at a rate approaching 5000 lb per hour, or about 37,000 lb per 8-hr shift.

(SR-4 Load Cells are a product of the Baldwin-Lima-Hamilton Corp., Dept. CP, 940 Simpson St., Philadelphia 42, Pa. . . or for more information check CP 6257 on handy form opposite last page.)

# NO WILD "Horses" HERE!



## CARRIER NATURAL-FREQUENCY CONVEYORS CAN'T "KICK OVER THE TRACES"

CONVENTIONAL "brute force" vibrating conveyors use up to 90% of their power output to operate their own moving parts. By their very nature, they bear the seeds of their own destruction. Yet, until the development of Carrier Natural-Frequency Conveyors, it was necessary to "pay the price"—in excessive power costs, maintenance and down-time—in order to utilize the advantages of vibrating conveyors. It is necessary *no longer*.

Carrier Natural-Frequency Conveyors substitute the *natural resonant action of coil springs* for brute force. These amazing conveyors require only a very small motor to vibrate the pans in the natural frequency of the springs.

## NO MAINTENANCE PROBLEMS FROM THIS POWER SOURCE!



Most of the "horses" required to operate Carrier Natural-Frequency Conveyors are repeatedly stored up in a trouble-free, maintenance-free source . . . rugged coil springs. The only moving parts in the entire conveyor are in the drive mechanism . . . and even there, only four ball bearings and compression rubber bushings! This adds up to an *absolute minimum of maintenance and down-time* . . . and utilization of *far less power*.

## CARRIER NATURAL-FREQUENCY CONVEYORS



A special Carrier Natural-Frequency Conveyor with  $\frac{3}{8}$ " pan, 27" wide, bringing crushed stone (6" lumps to fines) from

pit directly under jaw crusher to grade, in a refractory plant. Surge loads 75 to 100 tons per hour, up a 7° grade.

## TEST NATURAL FREQUENCY IN YOUR ROCKING CHAIR

If you rock in the natural frequency of your rocking chair, you'll find that it takes substantially *no physical effort* to rock in perfect comfort for hours. However, if you want to rock faster, or even slower, you'll find that it does require considerably more effort. Rocking then becomes a strain instead of a comfort. Try it.



## GET ALL THE FACTS ABOUT CARRIER NATURAL-FREQUENCY

If brute force conveyors are robbing you of valuable production time and profits, get *all* the facts about Carrier Natural-Frequency Conveyors today. Use the coupon.

- Carrier Conveyor Corporation  
2158 Frankfort Avenue, Louisville 6, Kentucky
- Gentlemen: Without obligation, please send me Carrier Natural-Frequency Conveyor Bulletin No. 111.
- Firm \_\_\_\_\_
- Street \_\_\_\_\_
- City \_\_\_\_\_ State \_\_\_\_\_
- Att. Mr. \_\_\_\_\_ Dept. \_\_\_\_\_

When inquiring check CP 6258 opposite last page

... You enjoy many  
money-saving features  
when you demand ...

## DARNELL CASTERS & WHEELS



**RUBBER TREADS** ... a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

**RUST-PROOFED** ... by the Udylite process, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

**STRING GUARDS** ... Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

**LUBRICATION** ... all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Zerk fittings are provided for quick grease-gun lubrication.

**Darnell Casters and Wheels  
Always**

**SWIVEL  
and ROLL**

DARNELL CORPORATION  
LTD.

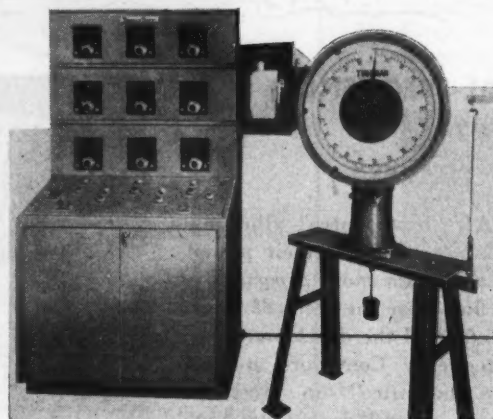
DOWNY (LOS ANGELES COUNTY) CALIFORNIA  
30 WALKER STREET, NEW YORK 13, NEW YORK  
34 NORTH CLINTON STREET, CHICAGO 4, ILLINOIS

When inquiring check CP 6259  
opposite last page

## MATERIAL HANDLING

### Continuous or intermittent batching are pushbutton operations

Electronic batching system is designed to automatically batch any number of materials to predetermined formulas. By coordinating controls of system with controls of a plant, completely automatic operation is possible. Thus, all materials



System may be set for one batch, continuous batching or any specific number of batches

in any formula can be automatically and accurately weighed and transferred from storage bins to mixers and processing machinery with minimum handling and without time consuming delays.

Formulas are preset on control panel for any batch. If changes in formulas are desired, they are quickly, made by resetting control dials. Any number of formulas can be preset for batching.

Controls may be arranged for either accumulative or consecutive weighing batch plants. Electrical interlocks insure proper sequence of filling, dumping and recycling.

Light on panel shows which ingredient is being fed into hopper. After hopper is dumped, scale returns to zero.

(Batching system is a product of Thurman Machine Co., Dept. CP, 156 N. Fifth St., Columbus, Ohio. Check CP 6260 opposite last page.)

### Shows how to lift, move half-ton by hand

Printed in two colors, four-page bulletin pictures and describes hand trucks designed to lift and move loads up to 1000 lb.

"Zephyr Hand Lift Truck" is issued by Yale & Towne Mfg. Co., Dept. CP, 11000 Roosevelt Blvd., Philadelphia 15, Pa. When inquiring specify CP 6261 opposite last page.

## EFFECTIVE, ALL-DIRECTIONAL VIBROLATION MOVES GRANULAR OR WET MATERIAL NOISELESSLY

The simplest, most quiet answer for moving materials in hoppers, chutes and bins. One moving part, no lubrication, no maintenance, never harms the equipment on which it is mounted. Instantly self-starting every time. Vibrolator is the only vibrator that can guarantee this regardless of operating conditions. Write for catalog. You will also receive form for describing your problem. No obligation!



### VIBROLATORS®

®Vibrolator is a registered trade name and applies only to the patented Peterson Vibrolator.



ENGINEERING COMPANY

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When inquiring check CP 6262 opposite last page

alphabetical  
index  
on  
page 237



... for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 237. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want ... in a hurry!

CHEMICAL PROCESSING

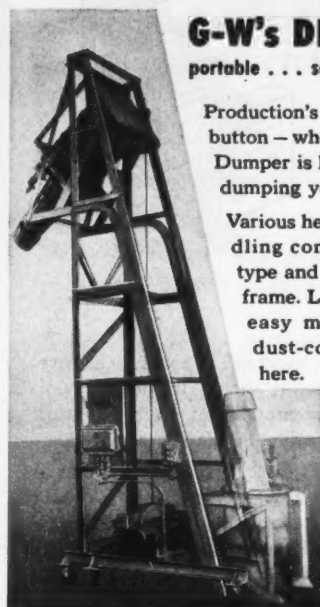


**All you lift is your finger!**

**Production UP—costs down  
with**

## **G-W's DRUM DUMPER**

portable . . . semi-automatic . . . strong



Production's up—with the press of a button—when a rugged G-W Drum Dumper is lifting and automatically dumping your drums.

Various heights to suit specific handling conditions. Units for any type and size drums. Heavy steel frame. Long-life truck casters for easy moving. Available with dust-control spout, as shown here.



**FREE!**  
Write for G-W's idea book on  
engineered materials handling  
systems.

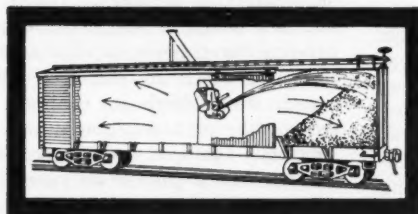
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HUDSON, N. Y. AND PRINCIPAL CITIES

When inquiring check CP 6263 opposite last page

## **S-A SWIVELoader**

*loads cars fuller... faster*  
... without hand trimming

One man  
operation  
part time



The S-A Swiveloader enables one man to fill and trim box cars faster and cheaper . . . without exposure to dust and accident. Will handle up to 150 tons per hour of practically any dry, bulk material up to 2" sizes.

**WRITE TODAY**  
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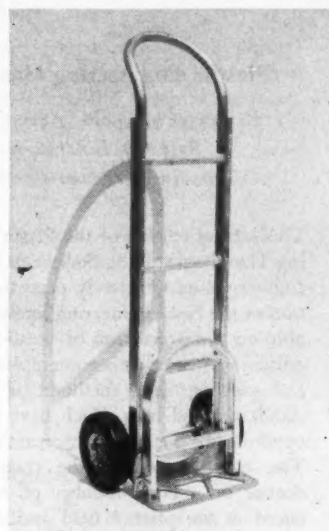
STANDARD PRODUCTS DIVISION  
**STEPHENS-ADAMSON**  
MFG. CO.  
11 Ridgeway Ave. Aurora, Illinois

When inquiring check CP 6264 opposite last page

## **MATERIAL HANDLING**

**Equips hand trucks  
for bulky load  
handling**

Folding nose plate extension adapts hand trucks for carrying large containers and other bulky loads. Available in choice of lengths for use with manufacturer's line of magnesium hand trucks, extensions are constructed



When not in use, extension folds out of way

of low-weight, high-strength magnesium extrusions. When not in use, nose plate extension can be tilted back to upright position.

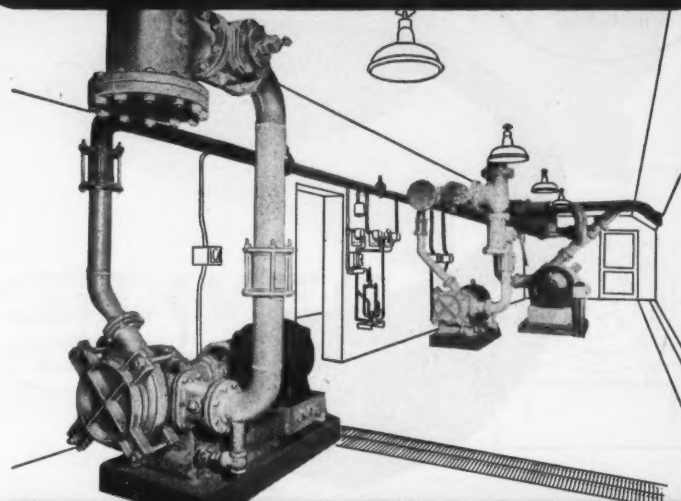
(Nose plate extensions are a product of Materials Handling Div., Magnesium Company of America, Dept. CP, East Chicago 19, Ind. Check CP 6265, opp. last pg.)

**Shows features and uses  
of straddle carriers**

Booklet of 16 pages uses case history approach and on-the-job photographs to describe carrier applications in 22 plants in 10 industries.

"The One-truck Fleet" is issued by Clark Equipment Co., Industrial Truck Div., Dept. CP, 24th St., Battle Creek 9, Mich. Check CP 6266 opp. last page.

**Handles extremely thick  
slurries with high  
specific gravities**



## **MORRIS Type R SLURRY PUMP**

Heavy viscous slurries with solids ratios as high as 70% by weight are not unusual loads for a Morris Type R Slurry Pump.

A case in point is this Morris installation at the Missouri Portland Cement Co., St. Louis, Mo. The two Morris 3R Pumps in the foreground each handle 200 GPM of a cement slurry at 64% solids with 1.66 specific gravity. Speed is 1180 RPM. The 6R Pump in the background handles 600 GPM of the same slurry at 880 RPM.

**Long operating life...  
little or no maintenance**

Massive running parts of the Type R compensate for the increased load imposed by high specific gravities. Hydraulic passages are deliberately designed for high concentrations of solids—the result of careful study of wear patterns shown by pumps in the field handling all kinds of abrasive materials. Elimination of areas of throttling and turbulence assures uniform wear of all parts.

There are no internal studs or bolts—no troublesome internal joints and fits. The suction disc liner is merely clamped into position between disc and shell. The absence of high stress on the shell permits wide variations in its composition—including materials of high abrasive resistance—to resist wear and extend the operating life of the pump.

Let our engineers consult with you on your slurry pump problems. They'll give you the benefit of 88 years of pump-building experience. Or, write for Bulletin 181.

**MORRIS MACHINE WORKS**  
Baldwinsville, New York  
Sales Offices in Principal Cities

**MORRIS** Centrifugal Pumps

When inquiring check CP 6267 opposite last page

## A PUMP PACKING THAT'S EXPENSIVE, BUT **CHEAP!**



### Lasts at least **3** times longer than ordinary pump packings

Frankly, the service reports on LATTICE BRAID asbestos packing with Teflon surprised us! Originally designed and test-proven for use against severe acids, caustics, and other chemicals, this particular packing has out-performed other packings (*even our own*) on more common applications against water, steam, solvents, and oils.

And here's why: (1) The LATTICE BRAID construction gives greater strength; (2) The Teflon core and heavy Teflon impregnation resist everything except molten alkali metals and some freons; (3) It does not adhere to the shaft or rod; (4) It runs smoother and freer than packings without Teflon.

Check these typical service reports:

- Against blending waxes and steam (for cleaning), it outlasted another Garlock style 10 to 1
- Against caustic at 325°F., 50 p.s.i., it outlasted competitive packing 38 to 1
- Against cold water, it out-performed other packings 3 to 1

LATTICE BRAID with Teflon is available in either Canadian white asbestos (style 5861) or blue African asbestos (style 5880). Each is furnished in packing sizes  $\frac{3}{16}$ " to  $1\frac{1}{2}$ " graduated by sixteenths.

Try an order of 10 feet or more today. Chances are you can *reduce* down-time, maintenance and replacement costs to *one-third* of their present amount.

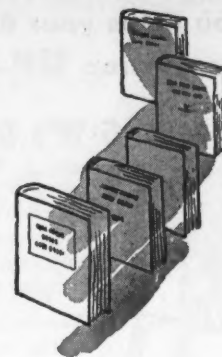
**THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK**  
Sales Offices and Warehouses: Baltimore • Birmingham • Boston • Buffalo  
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**GARLOCK LATTICE BRAID  
with TEFLON**

When inquiring check CP 6268 opposite last page

## Recent Books



### Plastics Engineering Handbook

Reviewed by G. M. ARMSTRONG  
Research Laboratories  
Tennessee Eastman Company

This second edition of the Plastics Engineering Handbook of the Society of the Plastics Industry is an effectively presented compilation of the best engineering knowledge available on the processing of plastics. The first edition (1947) has been completely revised, and plastics, data, methods of processing, standards, and uses which have been developed during the past seven years are covered. The book represents the cooperative endeavor of a large number of men experienced in the plastics field and representing the entire plastics industry; hence, the material is thoroughly grounded on practical experience in the application of physics and chemistry to the problem of processing plastics.

The five sections of the handbook are divided into chapters dealing with specific subjects. The Materials and Processes section has chapters on processes, under the following headings: molding; extrusion, preforming, drying, and preheating; forming, drawing, and postforming; casting; and imbedding; on materials, including rigid molding materials, reinforced plastics, vinyl dispersions, and laminated products; and on tooling with plastics for production. Design principles and standards for molded articles and molds, together with standards for tolerances and inserts, are treated in considerable detail in the Design section.

The Finishing and Assembly section has a chapter on machining, finishing, and decorating, as well as comprehensive chapters on cementing, welding, and assembly and on assembly gluing. Two final sections, one on testing of plastics articles and one on the voluntary commercial standards on plastics promulgated by SPI, and a concise, well-organized index complete the book.

This 850-page handbook is a comprehensive reference guide. It should further the aim of the technical program of the SPI toward maintaining quality in plastics applications throughout the industry.

To obtain "Plastics Engineering Handbook" remit \$15 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

### Adhesive Bonding of Metals

Reviewed by M. V. NEVITT  
Head, Metallurgical Engineering Dept.  
Virginia Polytechnic Institute

George Epstein's book details the application of adhesive bonding as a means of joining engineering materials, particularly metals. Adoption of adhesive bonding methods has been most widespread in the fabrication of aircraft where, according to the author, the substitution of adhesive joints can result in a saving in weight of 30 per cent. Bonding materials are classified as structural adhesives, which are employed where extremely strong joints are required, such as the bonding of brake linings, and as non-structural adhesives, which are used to locate unloaded parts in an assembly.

The functions and characteristics of the basic ingredients are described in terms of three material types: thermosetting resins, thermoplastic resins, and elastomeric substances. Temperature effects are discussed and a chapter is devoted to high temperature bonding materials. Bonding techniques, design and testing of joints, and metal sandwich construction are treated in detail. Air Force specifications and mechanical properties are appended. Good use is made of graphs and charts in illustrating adhesive characteristics.

To obtain "Adhesive Bonding of Metals" remit \$2.95 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.



**reviews of current technical and reference works  
... summarized for you by authorities in the field  
working with the CP staff**

### Qualitative Inorganic Chemistry

Reviewed by G. L. CLARK  
Research Professor Analytical Chemistry  
University of Illinois

This excellent text by G. Charlot of L'Ecole Supérieure de Physique et Chimie, Paris, is the most courageous road block to the decline of qualitative analysis that has yet been attempted. Although qualitative analysis has had an honored place in the earlier development of chemistry, it has been so rapidly running down hill that in many institutions it has been completely eliminated as a separate course. It is not difficult to understand this situation since the presentation and practice of qualitative analysis have remained largely unchanged in 80 years.

The author is correct in describing the classical method of qualitative inorganic analysis as cumbersome, slow, inexact, and messy since it depends upon very imperfect and complicated separations. While all other branches of chemistry have moved forward towards modern scientific interpretation, qualitative analysis has remained largely concerned with descriptive aspects of chemistry. Professor Charlot shows how the teaching and practice of qualitative analysis can be put on an entirely new and modern basis by concentrating all methods which modern physical chemistry and quantitative analysis, especially colorimetric analysis, make available. The qualitative "groups" along with some of the separations disappear and most detections are made in solutions with extensive use of pH and redox potential control, complex formation, extraction with solvents, and similar techniques.

Part I presents in 19 chapters the fundamental physical-chemical theory to which chemical students are introduced early in their chemical careers. Part II presents the chemical properties and characterization of ions which permit detection and identification. Part III lists the essential information on techniques and methods of qualitative analysis.

Discrimination between the so-called familiar and less familiar elements no longer exists, for today the chemists must be faced

with beryllium, titanium, zirconium, thorium, niobium, tantalum, uranium, gallium, indium, thallium, germanium, vanadium, molybdenum, tungsten and other elements which have been completely neglected in classical schemes.

This book of 354 pages is simply packed with information with scarcely a spare word anywhere. However, the presentation is remarkably clear and forms a basis for any necessary augmentation by the instructor. Thus a road block to decline becomes a land mark of rejuvenation.

To obtain "Qualitative Inorganic Analysis" remit \$7 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. When inquiring specify CP 6269 on handy form opposite last page.

### General Chemistry: A Topical Introduction

Reviewed by DAVID LEVI  
Assistant Professor of Chemistry  
Virginia Polytechnic Institute

"General Chemistry: A Topical Introduction", by Eugene G. Rochow and M. Kent Wilson, will serve as an excellent introduction to chemistry for a student who is majoring in a field requiring a rigorous background in the subject.

The arrangement of topics is logical. For example, the concept of atoms and atomic structure is presented initially, followed by a discussion of the periodic system. Copper, silver and gold are then discussed as examples to illustrate the principles developed. Again, after consideration of gases, solids and liquids, oxygen, hydrogen and water are considered in detail as examples.

This 580-page book contains a fairly well-balanced blend of fundamental principles and descriptive material illustrating the principles developed. Chapters not usually found in beginning texts on "The Sea as a Chemical Storehouse" and "Our Resources" are excellently written and will probably be of much interest to the student. The non-historical approach is used, but a short dis-

(Continued on next page)



## OLIVER Type L Centrifugal Pump CORROSION RESISTING

**Stainless Steel • Bronze  
Cast Iron**

Here's a corrosion resistant chemical pump with outstanding improvements in design and performance characteristics. Among its outstanding features is the high cut-water (see sectional drawing) which minimizes formation of air pockets at top of volute. This makes the pump self-venting and improves priming. This feature alone contributes materially to the high capacity and smooth operation of the pump.

Oliver Type L pumps can be supplied with a variety of corrosion resistant metals. All parts in contact with liquid being pumped in sizes 1¼", 1½" and 2" are available with Carpenter 20 or No. 316 stainless steel, bronze or cast iron. The 1" model is available with Carpenter 20 stainless steel only.

Each size, except the 1", can be supplied with three different impeller sizes. 1" model uses 3¼" impeller exclusively. Shaft for 1" model is fitted with mechanical seal with ceramic against carbon sealing face. 1¼", 1½" and 2" models can be supplied with either of two seals . . . conventional stuffing box with packing or Oliver Carbon Seal Type C.

Bulletin No. 310 gives you complete details on the Type "L" pump. Write for your free copy.

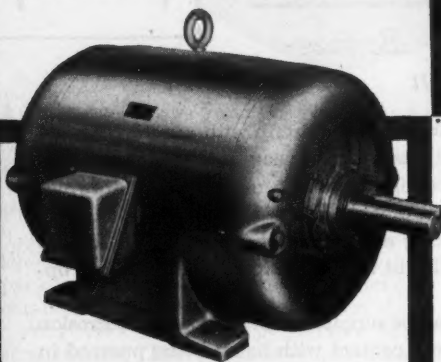
And don't forget . . . in addition to the Type "L", Dorr-Oliver manufactures a complete line of pumps for the chemical, metallurgical and sanitation fields. For complete information and bulletins, write Dorr-Oliver Incorporated, Stamford, Conn.



When inquiring check CP 6270 opposite last page

**Wagner**  
ELECTRIC MOTORS  
...the choice of leaders  
in industry

use  
**WAGNER**  
Cast Iron Frame  
Motors for  
**EXTRA PROTECTION**  
In corrosive  
atmospheres



Type EP, totally-enclosed fan-cooled. Available in ratings from 2 to 250 hp.



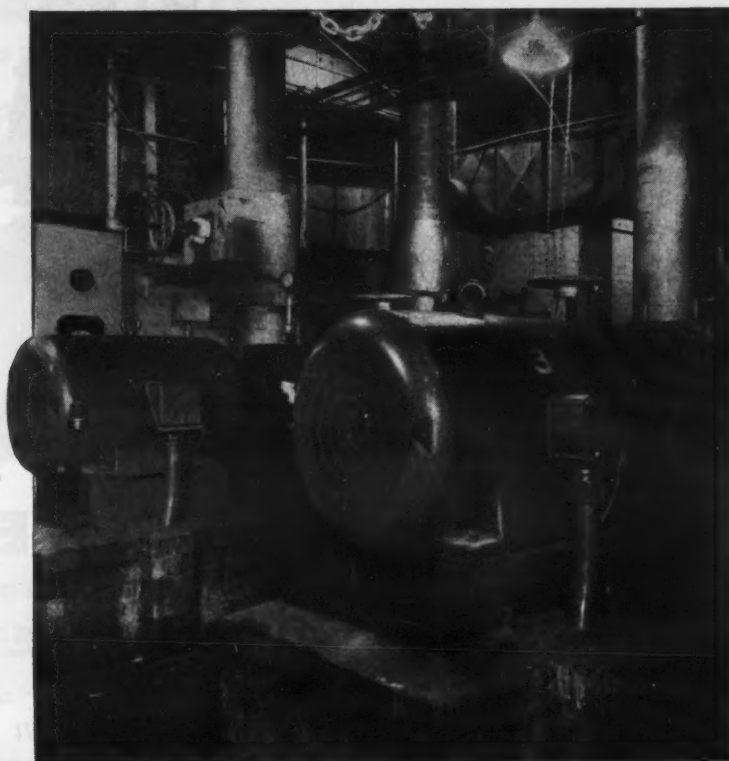
Type JP, non-ventilated. Explosion-proof. ½ through 1½ hp.



WAGNER ELECTRIC CORPORATION  
6359 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

When inquiring check CP 6271 opposite last page



These 150 hp Wagner Cast Iron Frame Motors drive brine pumps in an acid area at Celanese Corporation's Rock Hill, S. C. plants

If the motors in your plant are subjected to corrosive fumes and liquids, Wagner Cast Iron Frame Motors will provide the *extra protection* you need.

These stock motors are totally-enclosed in corrosion-resistant cast iron. All parts exposed to the atmosphere are fabricated of corrosion-resistant material—even the nameplate. Features include completely protected laminations... special varnish treated windings... a running shaft seal.

Wagner Cast Iron Frame Motors are available in fan-cooled standard and explosion-proof types in ratings from 2 to 250 hp, and in non-ventilated standard and explosion-proof types in ratings from ½ through 1½ hp; Wagner Bulletin MU-132 gives complete information.

A skilled Wagner engineer will help you select the Wagner Motor to meet your most exacting specifications. Call the nearest of our 32 branch offices, or write us.

ELECTRIC MOTORS  
TRANSFORMERS  
INDUSTRIAL BRAKES  
AUTOMOTIVE  
BRAKE SYSTEMS—  
AIR AND HYDRAULIC

## RECENT BOOKS

(Continued from preceding page)

cussion of the history of chemistry is given in the appendix.

The fundamental laws used have been derived in more detail than seems necessary for a beginning course. However, the book in general is a well-written and thorough introduction to the subject.

To obtain "General Chemistry: A Topical Introduction" remit \$6 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. When inquiring specify CP 6272 opposite last page.

### Fiberglas Reinforced Plastics

Reviewed by JOHAN BJORKSTEN

Bjorksten Research Laboratories, Inc.

This 244-page book by R. H. Sonneborn, A. G. H. Dietz, and A. S. Heyser presents a concise survey of the field of glass fiber reinforced plastics. Part I includes discussion of materials, fabrication techniques, inspection and testing, properties, practical design considerations, and applications. These discussions are not overly technical nor burdened with too much detail. For this reason, the newcomer to the field will find this book an excellent general reference. To persons of considerable technical experience, Part I may be of less value.

To date, the most reliable guides to design of reinforced plastic parts have been experimentation and experience. Everyone connected with reinforced plastics will therefore welcome Part II of this book. It presents two approaches written by engineering authorities: (1) basic design theory and (2) design for structural applications.

The text of the book is written in readable style. It is well illustrated with photographs and with diagrams, charts, and tables which are notable for their clarity and simplicity.

To obtain "Fiberglas Reinforced Plastics" remit \$4.50 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y.

### Chemical Process Principles Volume I

(Staff Review)

Close to a dozen years back, O. A. Hougen and K. M. Watson authored "Industrial Chemical Calculations." They have just revised with the help of Roland Ragatz the original volumes in the light of the most recent technological advances, and changed the name to "Chemical Process Principles". Volume I, 504 pages, is now available. It covers material and energy balances. Volume II will discuss thermo-

CHEMICAL PROCESSING



## RECENT BOOKS

dynamics, and Volume III kinetics and catalysis.

Volume I and the others concentrate on process problems of a chemical and physicochemical nature, and doesn't step into the fields of unit operations and equipment design. But the information is practical as well as theoretical: all problems (40% of them new) were selected from actual industrial situations.

Latest physical and chemical constants are in the tables, and generalized procedures for estimating certain missing data are provided. Chapter on mathematical procedures and conversion of units has been added.

To obtain "Chemical Process Principles, Volume I" remit \$8.50 direct to John Wiley & Sons, Inc., Dept. CP, 440 Fourth Ave., New York 16, N. Y. When inquiring specify CP 6273 opposite last page.

### Comprehensive Inorganic Chemistry, Vol. III The Halogens

Reviewed by JOHN W. MURRAY  
Professor of Chemistry  
Virginia Polytechnic Institute

This volume, edited by Sneed, Maynard, and Brasted, is the third to appear of a series of eleven. The introduction presents a general discussion of the group as a whole and an extensive table of the radioactive properties of the isotopes of each element in the group. (The term "nuclides" employed in the first volume is not used in this one.) The first five chapters are devoted to the individual halogens: fluorine, chlorine, bromine, iodine, and astatine. The length of these chapters seems to be an inverse function of the atomic number. Detailed methods of production, physical and chemical properties, and some thermodynamic data are included.

Subsequent chapters deal with the hydrogen halides; oxycompounds of the halogens; positive halogens, including such compounds as  $\text{INO}_3$  and  $\text{IPO}_4$ , the interhalogens, and polyhalide ionic complexes; and pseudohalogens, such as  $(\text{SCN})_2$ .

This well-written, 250-page book is not intended to be a complete compendium of the halogen compounds. However, the space devoted to diagrams of the commercial cells used to manufacture chlorine might have been better employed to extend the range of compounds covered. The treatment of the subject is not purely descriptive, but an effort is made to show the relationships of structure and electronegativity to chemical properties.

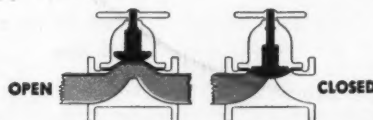
To obtain "Comprehensive Inorganic Chemistry, Vol. III, The Halogens" remit \$5 direct to D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 10, N. Y. When inquiring specify CP 6274 on handy form opposite last page.



## GRINNELL-SAUNDERS DIAPHRAGM VALVES

In industrial plants all around, Grinnell-Saunders Diaphragm Valves are preferred. Why? Because they have proved themselves economical and efficient in handling materials as diversified as corrosive fluids, gases, beverages, foods, compressed air, suspended solids . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors.

Grinnell-Saunders Diaphragm Valves are available in a range of bodies, linings and diaphragm materials . . . and in a variety of styles and operating mechanisms. If you have a valve problem, it certainly will be well worth your while to consult a Grinnell engineer.



# GRINNELL

WHENEVER PIPING IS INVOLVED



Grinnell Company, Inc., Providence, Rhode Island

Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves  
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies  
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### Types of Grinnell-Saunders Diaphragm Valves

#### Bodies

Screwed ends — 1/4" thru 3"  
Flanged ends — lined or unlined, 1/2" thru 18"  
Butt weld ends — 1/2" thru 6"  
Socket ends — 1/2" thru 4"

#### Angle Bodies

Screwed ends — 1/4", 3/8", 1/2", 3/4", 1 1/4", 2"  
Flanged ends — 3/4" thru 6"

#### Bonnets

Handwheel operated bonnet (available with rising stem, travel stops, extended stem, chainwheel, adapted for Tejax indicator)  
Quick turn — lever operated bonnet, 1/2" thru 3"  
Bendix-Westinghouse topworks  
standard (air to close — spring to open)  
Robotaire, 1/4" thru 1"  
Rotochamber, 1" thru 4"; in tandem, 5", 6"  
direct acting (spring to close — air to open)  
Robotaire, 1/4" thru 1"  
Rotochamber, 1" thru 4"  
double acting (air to close — air to open)  
Robotaire, 1/4" thru 1"  
Rotochamber, 1" thru 4"  
Piston operated, 6" thru 12"  
Sliding stem bonnet, 1/2" thru 12"

#### Diaphragms

Natural rubber, neoprene, reinforced neoprene for vacuum, hycar, butyl, white gum rubber, Kel-F, Teflon, polyethylene.

#### Body Materials

Iron, bronze, stainless steel, cast steel, aluminum, monel, saran, durimet

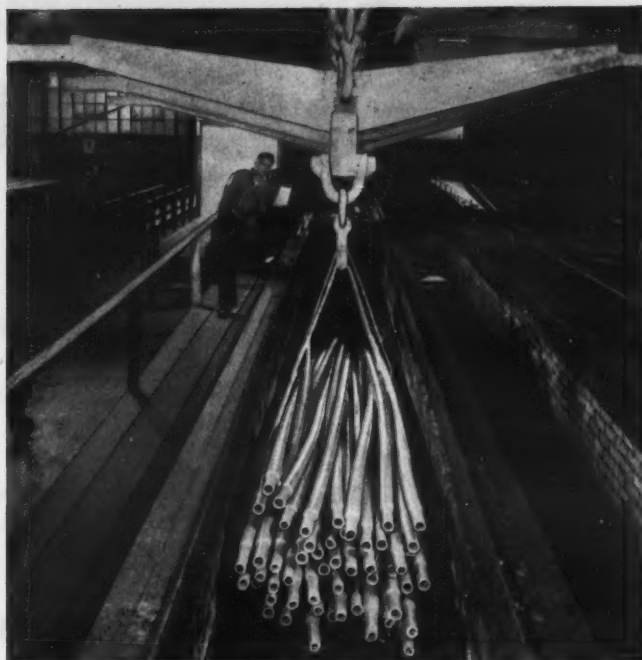
#### Body Linings

Glass, lead, soft rubber, hard rubber, neoprene, saran

#### Bronze Beer Valves

Socket both ends  
Socket end to flange end  
Flange both ends  
Socket end to male hose thread end  
Flange end to male hose thread end  
Male hose thread both ends

When inquiring check CP 6275 opposite last page



Installed by National Acid-Proofing Inc., Tinley Park, Illinois

## New Answer to Process Problem

### ... VYFLEX L-10 STOPS TANK CORROSION

Globe Steel Tube Company of Milwaukee, Wisconsin tried everything. But 20% nitric acid-hydrofluoric acid solutions at temperatures of 80 to 90°F ruined every lining applied to their 47-foot pickling tank. Finally, Globe engineers hit on Vyflex L-10, and haven't spent a penny on lining maintenance or replacement since.

Globe Steel Tube learned, as so many other firms have, that the first cost of Vyflex L-10 is the last cost for lining materials. That's because this new lining material, based on Polyvinyl Chloride resins, excels in all three important categories of lining performance:

1. L-10 resists acids, alkalis, salts, plating solutions, and organic compounds at temperatures up to 160°F... even protects against oxidizing acids like chromic, nitric, and phosphoric, and highly concentrated strong alkalis.
2. L-10 is strong and elastic... withstands the toughest kinds of abrasion and mechanical abuse.
3. L-10 presents no application problems. Qualified Kaykor applicators across the country give fast, professional service applying L-10 to steel, wood, concrete, in the field or in the shop.

**GET THE FACTS!** Write today for the complete story on Vyflex L-10 in "Facts You Should Have", and Engineering Bulletin L-10, free on request. Kaykor will also be happy to send you complete information on other Vyflex products, including F-92 Unplasticized Polyvinyl Chloride plate, sheeting, pipe, duct, and fittings; and Vyflex FL-85 Unplasticized Polyvinyl Chloride lining.

**VYFLEX**

TRADE MARK REG. U.S. PAT. OFF.

**KAYKOR INDUSTRIES, Inc.**

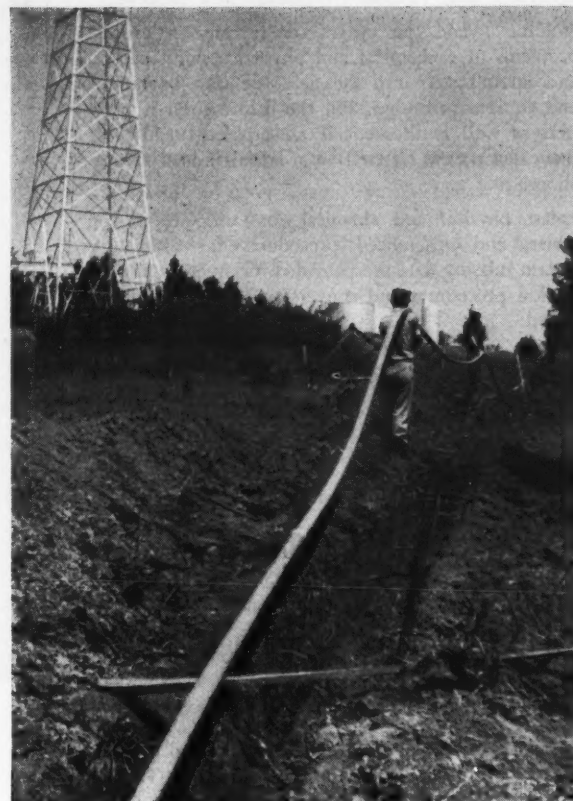
Division of Kaye-Tex Manufacturing Corp.

4401 BROAD STREET • YARDVILLE, NEW JERSEY

When inquiring check CP 6276 opposite last page

## corrosion control

Needing a pipeline to dispose of corrosive salt water, oil well operators chose plastic and were able to—



Flexible pipe was easily handled

*install 4000 ft  
of pipe a day*

**Thirty-foot lengths were joined in a minute, and with the flexible pipe, no breakage was encountered as three men ditched a 12-mile line**

A plastic pipeline, 12-miles long, was installed recently at a speed of almost a mile a day in Heidelberg, Miss. Solving a common problem of 14 independent oil well operators, the corrosion-resistant, flexible pipe carries unwanted salt water from 25 oil wells to a central disposal plant.

Plastic pipe was chosen for the job because of its lower cost and ease of installation.

Joining the pipe sections takes only a minute, and the pipe is sufficiently flexible so that straight trenches with flat bottoms were not needed.

Pipe is made from Kralastic, a tough corrosion-resistant blend of plastic (styrene acrylonitrile copolymer) and rubber. It was extruded into 30' lengths, 2 to 6" in diameter, by the Southwestern Plastic Pipe Co., Mineral Wells, Texas.

On the job, three men handled the installation of the pipe. Working one day behind the mechanical ditch digger, two men distributed pipe along the ditch, while the third made joints by solvent welding. Pipe has a built-in fitting on one end. Using a paint brush, the man doing the joining





Completing the field weld, the two pipes are pushed together after cement has been applied. Total time for making joint: one minute

smeared cement on the inside of the fitting and on the plain end of another section. The plain end was then forced into the fitting. In a minute the joint was completed.

When several hundred feet of pipe were joined, it was lowered into the ditch and snaked into long, smooth curves to take care of any expansion or contraction caused by temperature changes. There was no breakage while the easily-handled line was being installed. Where there was an intersection with a pipe feeding in from an oil well, the plastic pipe was merely cut with a hack saw and a fitting cemented into place. Line is 90% downhill and has pumps at only two points.

(Kralastic, plastic and rubber blend from which pipe was extruded, is a product of Naugatuck Chemical Div., US Rubber Co., Dept. CP, Rockefeller Center, New York 20, N.Y. . . . or for more information check CP 6277 on handy form opposite last page.)

#### Is corrosion licking you?

Then be sure to see July CP . . .

The feature section carried in December on Corrosion Control aroused such enthusiasm in our readers that we are planning to feature this subject again in July. In fact, we plan to highlight our regular monthly Corrosion Control section annually in view of the tremendous interest in this field.

How other plants have licked their corrosion problems will be told in performance stories. Latest developments in materials and equipment will be presented . . . plus a host of other topics. Remember July CHEMICAL PROCESSING for answers to corrosion problems!

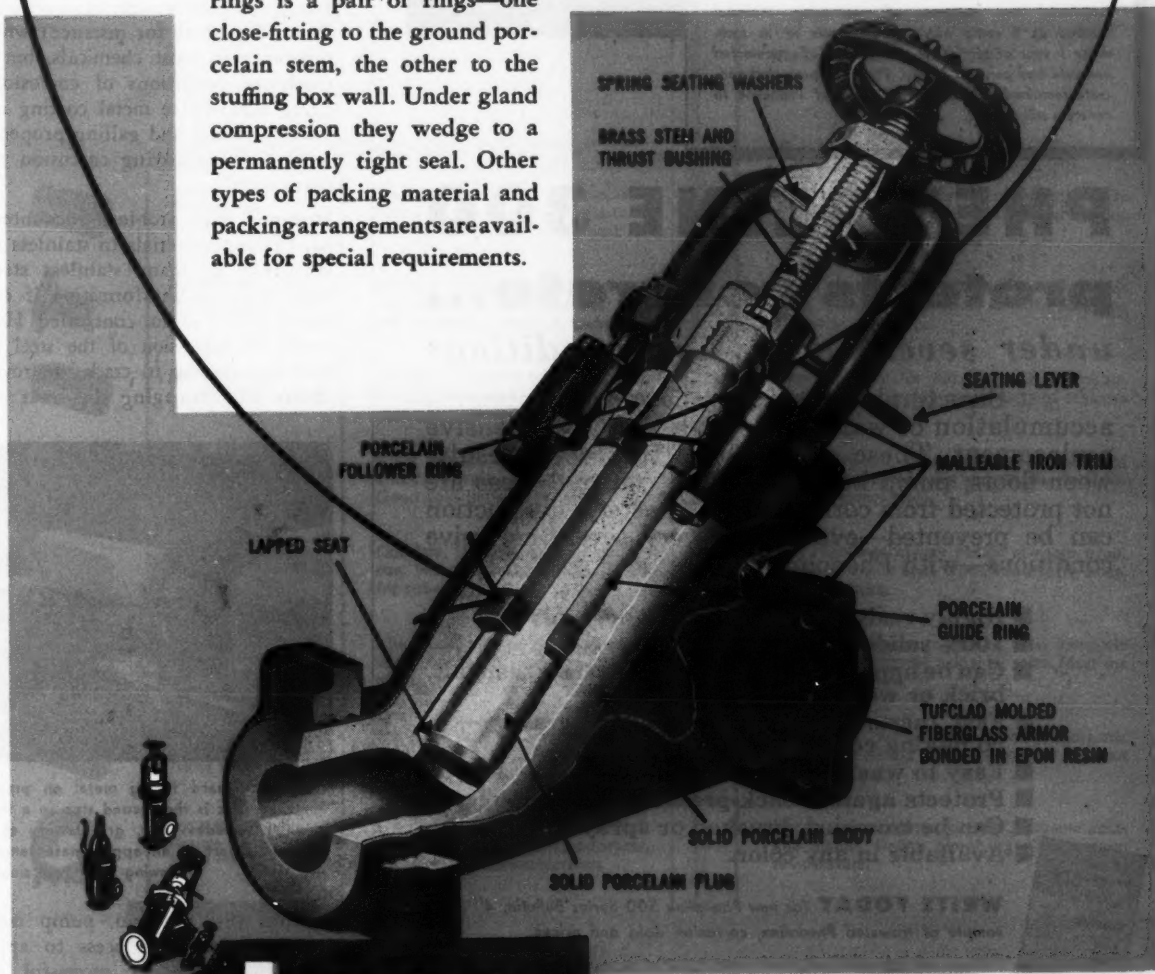
Editorial balance will be maintained, with other sections of CP appearing as always.

## Teflon Packing

... "all-service"

... maintenance-free  
in Lapp Valves

Solid, unfilled Teflon, in a wedge-ring arrangement, provides a packing for Lapp Porcelain valves which is long in serviceability, short on maintenance requirements. Each of the two sets of Teflon wedge-rings is a pair of rings—one close-fitting to the ground porcelain stem, the other to the stuffing box wall. Under gland compression they wedge to a permanently tight seal. Other types of packing material and packing arrangements are available for special requirements.



# Lapp

PROCESS EQUIPMENT

Chemical Porcelain Valves • Pipes • Raschig Rings  
Pulsafeeder Chemical Proportioning Pumps

Y-valves, angle valves, flush valves, safety valves, and plug cocks of Lapp Porcelain have standard bolt-circle flanges for easy connection to all piping and equipment. Write for bulletin with complete description, characteristics, and specifications. Lapp Insulator Co., Inc., Process Equipment Division, 428 Wendell St., LeRoy, N. Y.

When inquiring check CP 6278 opposite last page

## on-the-job PROOF!

Test patch of Phenoline 300 at passenger car wash station of a large Eastern Railroad. Patch was subjected to continual spillage of acid cleaning compound (sulphuric) and extremes of weathering. Material applied as 2 coats with total thickness of  $\frac{1}{8}$  inch. After 1 year of service, almost  $\frac{1}{2}$  inch of unprotected concrete had corroded away. Phenoline-protected concrete remained unaffected with bond of Phenoline to concrete still perfect.

# PHENOLINE 300 protects concrete... under severe corrosive conditions

Structural weakening... hazardous footing... accumulation of water and corrosives... expensive replacement. These are a few of the costly results when floors, pump bases and other concrete areas are not protected from corrosion. This wasteful destruction can be prevented—even under very severe corrosive conditions—with Phenoline 300.

- Highly resistant to acids, alkalies, solvents.
- 100% solids.
- Can be applied over new or old concrete, asphalt, brick or wood.
- Fast thermo-setting at room temperature—no baking required.
- Easy to wash down and keep clean.
- Protects against back-pressure and seepage.
- Can be troweled, brushed or sprayed.
- Available in any color.

**WRITE TODAY** for new Phenoline 300 Series Bulletin, 4" x 4" sample of troweled Phenoline, corrosion data and prices.

**carboline**  
C O M P A N Y

333 Thornton Ave., St. Louis 19, Mo.

A Division of Mullins  
Non-Ferrous Castings Corporation

Specialists  
in Corrosion Resisting  
Synthetic Materials

## CORROSION CONTROL

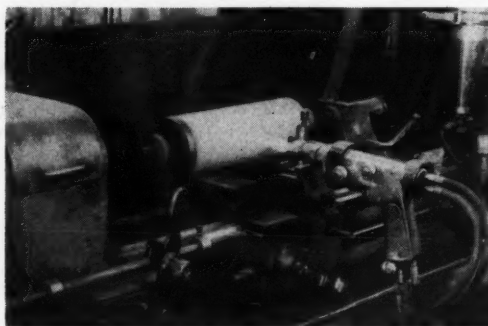
### Time saved in application of hard facing material to process pumps...

skilled manpower not necessary and rate of rejects is much lower

A West Coast manufacturer of process pumps reports appreciable savings in application time and amount of materials needed with a particular hard facing method, used to increase the corrosion and wear resistance of pumping units. In addition, this method of application doesn't require skilled manpower and results in a much lower rate of rejections.

Pump components are, of course, made of stainless steel (Type 410, for instance) which has excellent resistance to most chemicals, but may fail under combined conditions of corrosion and abrasion. Thus, a hard-face metal coating is applied to improve abrasion and galling properties, while maintaining or improving corrosion resistance of the part coated.

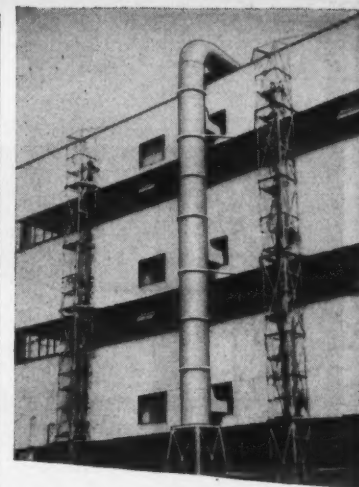
However, one problem encountered in applying hard facing materials to stainless steel parts is the sensitivity of many stainless steels (particularly Type 410) to transformation if cooling rate from above 1800°F is not controlled. Haphazard cooling results in expansion of the steel base causing the hard-face coating to crack, destroying its impermeability and damaging the wear surface.



Spraying hard facing metal on process pump shaft sleeve. This is the second step in a three-step method which includes: first, grit-blasting of part; and last, heating part to an approximate temp of 1900°F and allowing it to cool slowly

To lick this problem, pump manufacturer now uses a three-step process to apply a powdered nickel-base alloy for successful wear-proofing of Type 410 stainless steel. Fusion-bonded, non-porous coatings that offer abrasion and corrosion resistance up to 25 times that of hardened stainless steel are being successfully attained with a relatively low cost, fast application process.

The pumps themselves are giving excellent service in the field, often in 'round-the-clock' operations. For example, two of these pumps, installed in the



## IS A PLA-TANK® STACK THE ANSWER TO YOUR FUME PROBLEM?

Shown here is a light-weight, easily-erected PLA-TANK stack which handles fume exhaust at the new thorium plant of the Lindsay Chemical Co., West Chicago, Ill.

The stack has a 44" diameter, is 69' long including 90° elbow, cross run to fan chamber and riser beyond fan. There are inlets from three floors to handle exhausts from individual tank systems. Stack was prefabricated with flanges for fast installation.

PLA-TANK STACKS may also be the answer to your problem of venting corrosive fumes—inside or out. Consider these many advantages

- ... manufactured from long-life, resin-bonded glass fiber laminate
- ... resistant to a wider variety of fumes and temperature than ever before
- ... not affected by extremes in weather
- ... light weight, easy to install; need less rigging and support; save handling, freight, shipping charges
- ... competitively priced; available in diameters to 60"

Let us help you solve your problem the modern way — with PLA-TANK STACKS. Write today for free data sheets.

**THE Chemical CORPORATION**  
63 Waltham Ave., Springfield 9, Mass.

When inquiring check CP 6280  
opposite last page

CHEMICAL PROCESSING

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Los Angeles refinery of Union Oil Co. of Calif., handle a pentane mixture at 150°F and 200 gpm. Operator supervision is at a minimum.

(Sprayweld hard facing method is a development of Wall Colmonoy Corp., Dept. CP, 19345 John R St., Detroit 3, Mich. Check CP 6281 opposite last page.)

(West Coast manufacturer using hard facing method for corrosion-resistant process pumps is Byron Jackson Corp., Dept. CP, P.O. Box 2017, Terminal Annex, Los Angeles 54, Calif. Check CP 6281A opposite last page.)

### Maintenance downtime eliminated when columbium-containing steel used in alum evaporators

Unusual resistance to chemical attack of boiling alum has been demonstrated by a columbium-containing stainless steel used for the heating coils in four atmospheric alum evaporators operated by American Cyanamid Company, Linden, New Jersey. Alloy, known as Stainless No. 20-Cb, has completely eliminated downtime for maintenance, and assured uniform product quality.



Maze of heating coils and supports in bottom of alum evaporators have to resist corrosive action of boiling alum solution









Evaporators handle an alum solution with a concentration range of 8½ to 17%, and a temperature range of 239 to 245°F (115 to 116°C). The pH of the solution is approximately 2.5.

First Stainless No. 20 coil was placed in service in 1949. By 1950, all coils in the four evaporators were made from this alloy. All of these parts are still in service with no trace of pitting and little evidence of general corrosion. Estimated corrosion rate is .001 inches penetration per year.

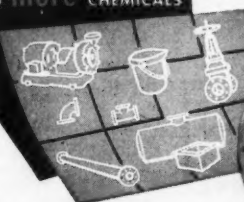
Prior to using stainless, company made its heating coils from other materials. Continual repairs were necessary with resulting interruptions in production. With the other coils, steam would frequently leak into alum solution and make it impossible to attain desired product quality from evaporators.

(Stainless No. 20-Cb steel is a product of Alloy Tube Div., The Carpenter Steel Co., Dept. CP, 110 Springfield Rd., Union, N. J. . . or for more information check CP 6282 opposite last page.)

85 to 100% of your  
corrosion-resistant piping needs  
now available from 1 source

WHICH PIPE SHOULD YOU USE...			WHERE... WHEN?
	<b>ACE-ITE</b> Threaded Pipe ½" to 6"	General purpose rubber-plastic blend. Tough, impact resistant. Odorless, tasteless. Economical.	Handles most common chemicals to 170°F. except a few strong acids and certain organic solvents.
	<b>RUBBER-LINED STEEL</b> Flanged Pipe 1½" to 24" and up	Strength and pressures of steel plus resistance of hard rubber. Soft rubber interlayer aids shock resistance.	Finest resistance to alkalis, most inorganic acids, many organic acids, all salts. Ideal for bleaches.
	<b>ACE TEMPRON</b> Threaded Pipe 1" to 8"	For hot corrosives to 260-275 deg. F. Rigidity and resistance better than previous nitriles.	Best anywhere for hot inorganic chemicals, acids. Also unusually wide variety of organics at room temp.
	<b>ACE RIVICLOR</b> Threaded Pipe ½" to 4"	Rigid plastic, special PVC. Outstanding aging characteristics. Good cold impact strength.	Lies between Saran and Parian. Not affected by most inorganic acids and alkalis. Good for many organics also.
	<b>ACE PARIAN</b> Threaded Pipe ½" to 2"	Odorless, tasteless, rigid polyethylene. Not strongest plastic, but best for sub-zero uses.	Best resistance of any plastic at room temp. except to acetic acid. Good for alkalis, acids, many organics.
	<b>ACE HARD RUBBER</b> Threaded Pipe ¼" to 8" Flanged Pipe 1½" to 8"	The oldest, still tops. Widest range of fittings of any rigid non-metallic pipe.	Extreme resistance to alkalis, most inorganic acids, many organic acids, all salts. Ideal for chlorine, fluorine.
	<b>ACE SARAN</b> Threaded Pipe ½" to 4" Tubing ¼" to 1½"	Odorless, tasteless, general-purpose rigid pipe and semi-flexible tubing. High pressures.	Excellent... not affected by most inorganic acids and alkalis. High resistance to most organics.
	<b>ACE-FLEX</b> Flexible Tubing ¼" to 1½"	General-purpose transparent flexible tubing. Non-toxic, odorless, tasteless. Can steam-sterilize.	Very good resistance to most inorganic acids and alkalis. Resists many organics at room temperature.

more RESISTANT  
TO more CHEMICALS



**ACE® rubber and plastic products**

**AMERICAN HARD RUBBER COMPANY**  
93 NORTH STREET • NEW YORK 13, N. Y.

When inquiring check CP 6283 opposite last page

point of interest  
to pump users...



● Chemiseal Mechanical Seals last longer and give unsurpassed performance in a wide variety of chemical services.

Three years of actual field experience has proven it—handling acids, alcohols, alkalis, hydrocarbons; clear, abrasive and tarry materials.

**Features:** Seal rotates with shaft. Only bearing surface is between precision ground rotating and stationary faces. Combines chemically impervious TEFLON with a balanced bellows design.

Low friction load on shaft. Lower power cost.

No scoring of shafts. Even shafts already scored can be satisfactorily sealed.

Pressures at seal up to 100 psi at 75°C or 75 psi at 100°C.

Sizes from 1/8" to 2 1/2". Maximum length 2 3/4". Other sizes for special applications.

Write for Bulletin No. MS-954.

**UNITED STATES GASKET COMPANY**  
CAMDEN 1, NEW JERSEY

**USG**

**FABRICATORS OF  
FLUOROCARBONS & OTHER PLASTICS**  
Representatives in principal  
cities throughout the world



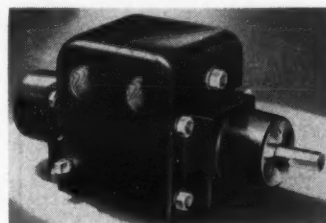
When inquiring check CP 6284 opposite last page

## CORROSION

**Boiling hydrochloric,  
oxidizing acids  
pumped**

**Uses:** Pumping of chlorine bearing fluids, acids, alkalis, and a variety of organic and inorganic chemicals compatible with synthetic rubber body of pump.

**Features:** Unit is available with Hastelloy B or Hastelloy C shaft, eccentrics and guides. Hastelloy B permits handling of boiling hydrochloric, sulfuric, and mixed acids. Hastelloy C extends pump service to highly oxidizing acids and such oxidizing agents as free chlorine and bleaching compounds.



Pump impellers can be of neoprene, Hypalon, or Teflon

**Description:** Synthetic rubber pump is a positive displacement oscillating rotary unit. Capacities up to 10 gpm and pressures to 100 psi are realized at a sustained 1725 rpm. Unit has high suction lift, is self-priming. All threads are molded internally to minimize strain. Impellers are of neoprene, Hypalon, or Teflon.

(Synthetic rubber pump is a product of Eco Engineering Co., Dept. CP, 12 New York Ave., Newark 1, N. J. Check CP 6285 opposite last page.)

**Valves and fittings  
molded of PVC**

Molded polyvinyl chloride valves and fittings are subject of illustrated four-page circular.

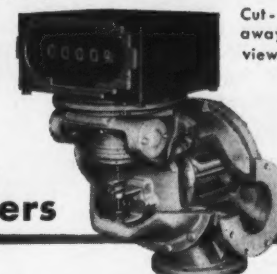
Circular 601 is issued by The Lunkenheimer Co., Dept. CP, PO Box 360, Cincinnati 14, Ohio. Specify CP 6286 opposite last page.

## Account For Corrosive Liquids

ALCOHOLS, VEGETABLE OILS,  
DEIONIZED WATER, ETC.,

with

**Rockwell  
"316"  
Stainless  
Steel Meters**



Cut-away view

## Be Sure of Your End Product

Want the finest degree of quality control in your formulations? Need accurate cost controls over liquid ingredients? Is inventory a problem? Are losses eating into your profits? Then turn to a basic accounting tool—Rockwell liquid meters. Get the accurate metered records you need to operate efficiently. Available in a wide variety of types, materials and sizes to suit every requirement. Our bulletins tell all. Write today.

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**ROCKWELL MANUFACTURING COMPANY**  
DEPT. 106-D, PITTSBURGH 8, PA.

When inquiring check CP 6287 opposite last page

**SAVE 50%  
on  
ROOF REPAIR**



**FREE BOOK  
SHOWS HOW  
90% of Leaky Roofs  
Can be Saved**

## Cut Costs in HALF with Unskilled Labor

There are no secrets or special skills to good roof repair! Free step-by-step book shows exactly how to recondition roofs... to give 90% of leaky roofs extra years of weather-tight life... to do the job right with unskilled labor at HALF the cost. Your business letterhead request brings "Saving Old Roofs" free. Write today!

**TROPICAL PAINT COMPANY**

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HEAVY-DUTY MAINTENANCE PAINTS SINCE 1883

When inquiring check CP 6288 opposite last page

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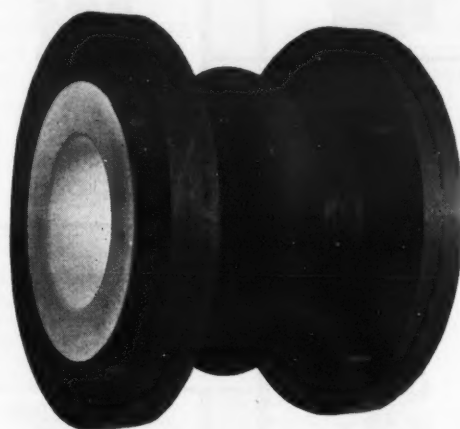
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**Pressure, temperature advantages  
of neoprene and duck combined  
with inert Teflon**

**Uses:** To absorb expansion in piping systems carrying acids and alkalis at pressures to 150 psi, temps to 250°F.

**Features:** Unit combines inertness of Teflon with strength, pressure and temperature advantages of neoprene and duck. "L"-shaped steel sleeve imbedded in neoprene and duck further strengthens joint, eliminates need for steel retainer ring behind flange.



**Description:** Neoprene and duck interior of expansion joint is lined with Teflon, which extends over flange faces. Exterior is coated with 1/16" neoprene. Steel sleeve prevents distortion and transmits bolt pressure directly to Teflon facing on flange, to assure leak-proof connection with companion flange. Duck, neoprene, and steel are never in contact with material carried in line.

Expansion joints are available in 2, 3, 4, 6, 8, 10, and 12" sizes. Sizes 2 through 10" withstand pressures to 150 psi, temps to 250°F. The 12" joint has a working pressure of 125 psi, temperature of 250°F.

(Teflon-lined expansion joints are products of John L. Doré Co., Dept. CP, 5406 Schuler St., PO Box 7772, Houston 7, Tex. Check CP 6289 on handy form opposite last page.)

**Fabricating, metallurgical data  
on high-strength rolled steel**

Fabricating data, sizes, and metallurgical information on Dynalloy is given in eight-page digest-size booklet.

Booklet D-93 is issued by Alan Wood Steel Company, Dept. CP, Conshohocken, Pa. Check CP 6290 on handy form opposite last page.



**ANSWER: Wherever you want:**

- Corrosion resistance
- Freedom from metallic contamination
- Immunity to thermal shock
- Low first cost and maintenance
- Ease of alterability and repair

**Manufactured Only By National Carbon Company**

"Karbate" impervious graphite equipment is often installed in services where other materials have proved inadequate. The same properties that enable "Karbate" products to meet these severe requirements can give you substantial savings in virtually all service conditions. On the basis of price, maintenance-cost and increased service life, "Karbate" products merit your first consideration wherever corrosion is a factor.

**Write for literature!**



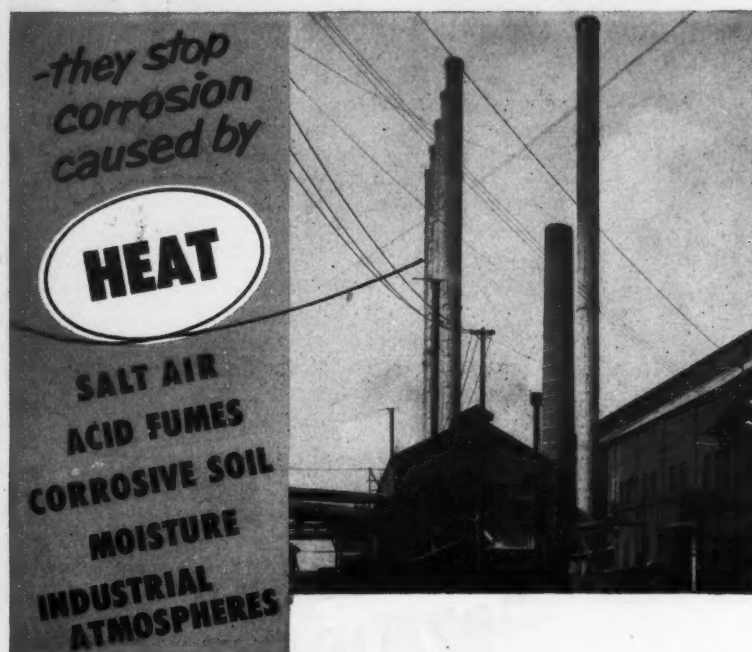
*The term "Karbate" is a registered trade-mark of Union Carbide and Carbon Corporation*

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A Division of Union Carbide and Carbon Corporation  
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Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco  
IN CANADA: Union Carbide Canada Limited, Toronto

When inquiring check CP 6291 opposite last page

# You can solve your tough corrosion problems by using Bitumastic® Coatings



**T**OUGH CORROSION PROBLEMS can be solved, but not by using ordinary paints or conventional protective coatings. For long-term protection, it takes specialized protective coatings . . . the Bitumastic Coatings Koppers makes.

Take these stacks, for example. Heat caused ordinary coatings to "give up" in two weeks to a month. Then, one thin coat of Bitumastic® Hi-Heat Gray was applied. After four years' service, this specialized coating was *still* in good condition.

Hi-Heat Gray resists intermittent

temperatures as high as 1200° F. It contains metallic zinc powder which, at high temperatures, tends to fuse to the underlying steel, providing a protection similar to metallic zinc.

No one coating can stop all kinds of corrosion. Therefore, Koppers makes an entire family of Bitumastic Protective Coatings. Send for free booklets describing them. At the same time, tell us about *your* corrosion problem so that we can recommend a method for its satisfactory solution. There is no obligation, of course.

## KOPPERS COMPANY, INC.

Tar Products Division, Dept. 479-T, Pittsburgh 19, Pennsylvania

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.



When inquiring check CP 6292 opposite last page

## CORROSION

### Resistance to most acids and alkalis exhibited by glass tapes

**Uses:** Wrappings for field coils, armature coils, and stator coils in DC motors and generators, and in AC induction motors, synchronous motors, and generators.

**Features:** Woven glass tapes have high tensile strength, good heat conductivity, low moisture absorption, and high resistance to most acids and alkalis.

**Description:** Hesgon series of glass tapes is available in all standard widths from 1/2 to 1 1/2" and in thicknesses from .004 to .015".

(Woven glass tapes are produced by Hess, Goldsmith & Co., Inc., Dept. CP, 1400 Broadway, New York, N.Y. Check CP 6293 on handy form, opposite last page.)

### Flexibility and resistance provided by Teflon tube for color coding

**Uses:** For color coding in many electronic and electrical applications, especially where environmental conditions are severe.

**Features:** Striped and solid colored non-rigid thin wall Teflon tube is so flexible that it can be wrapped around its own diameter without cracking.

**Description:** Flexible Teflon tubing has a high dielectric strength and can withstand temperatures from -90 to 260°C (500°F). Resistance to acids and other corrosives is very high. Teflon has zero water absorption, so insulation characteristics remain even in 100% humidity.

Tubing is available in diameters to accommodate wire sizes from No. 26 to No. 10. It comes in 10' lengths (approx) and is easily cut with scissors.

(Flexible Teflon tubing is a product of Hitemp Wires, Inc., Dept. CP, 26 Windsor Ave., Mineola, L.I., N.Y. Check CP 6294 on handy form opposite last page.)

## small gate valves?

need small 600 lb. gate valves?  
only PACIFIC can offer this selection!



fig. no. 3651

o. s. & y., bolted bonnet gate valve. a premium valve available in a wide choice of trim materials and recommended where a full port opening is required.

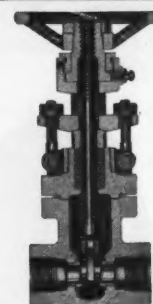


fig. no. 595

o. s. & y., bolted bonnet gate valve. comparable to fig. no. 3651 but somewhat more economical and its use is suggested where a full port opening is not essential.

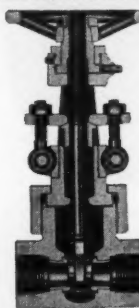


fig. no. 55

o. s. & y., union bonnet gate valve. an economical valve for those that prefer the compactness and dismantling features of the union bonnet construction.

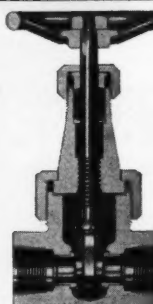


fig. no. 65

inside screw, union bonnet gate. a low cost compact valve for use where space and weight are important and where a full port opening is not required.

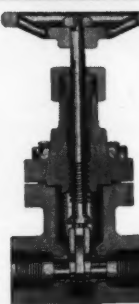


fig. no. 695

inside screw, bolted bonnet gate. the "competitor" to meet the tightest cost budget, yet offering the bolted-on bonnet feature, comparable to fig. no. 65.

write or phone today for additional information on these valves and on PACIFIC's entire line of corrosion resistant valves.

sales offices in all principal cities

## PACIFIC VALVES, INC.

3201 walnut avenue, long beach 7, calif.

phones long beach: l. b. 40-4541; los angeles: nevada 6-2325

"earning a good name in every industry"

When inquiring check CP 6295 opposite last page

CHEMICAL PROCESSING



**Life of tank car linings  
can be best estimated  
by long term tests . . .**

frequent loading and unloading of tank cars increases corrosion problem

Long term tests give best estimate of expected coating life of tank car linings, as pointed out in a recent technical paper. A testing method involving immersion of a coated panel, aeration, humidity, and heat has been found to give good results.

Corrosion problems associated with tank car shipments are different than those encountered with stationary tank storage. Additional corrosive conditions are introduced because of the frequent loading and unloading of the car. Most serious corrosion often occurs on return trip when some of lading is in bottom of car. Some typical linings which are being used in actual practice follow:

**Lining Used for Tank Car Shipments**

Commodity	Type of Lining
Hydrochloric acid	Rubber sheet or latex
Caustic soda, 73%	Rubber latex coatings
Caustic soda, 50%	Rubber latex and vinyls
Acetaldehyde	Phenolics
Acetone	Vinyls
Alcohol	Tin metal spray, vinyls
Phosphoric acid	Vinyls
Formaldehyde	Phenolics and rubber
Carbon tetrachloride	Phenolics

(Condensed from technical paper, "Coating Testing for Tank Car Linings," by J. Robert Spraul, General American Transportation Corp., Dept. CP, 300 W. 151st St., East Chicago, Ind. Paper was presented at the 1954 annual meeting of the National Association of Corrosion Engineers. It was published in the August issue of Corrosion.)

**Protective inorganic finishes  
for metals described**

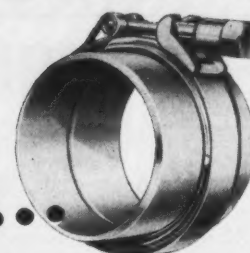
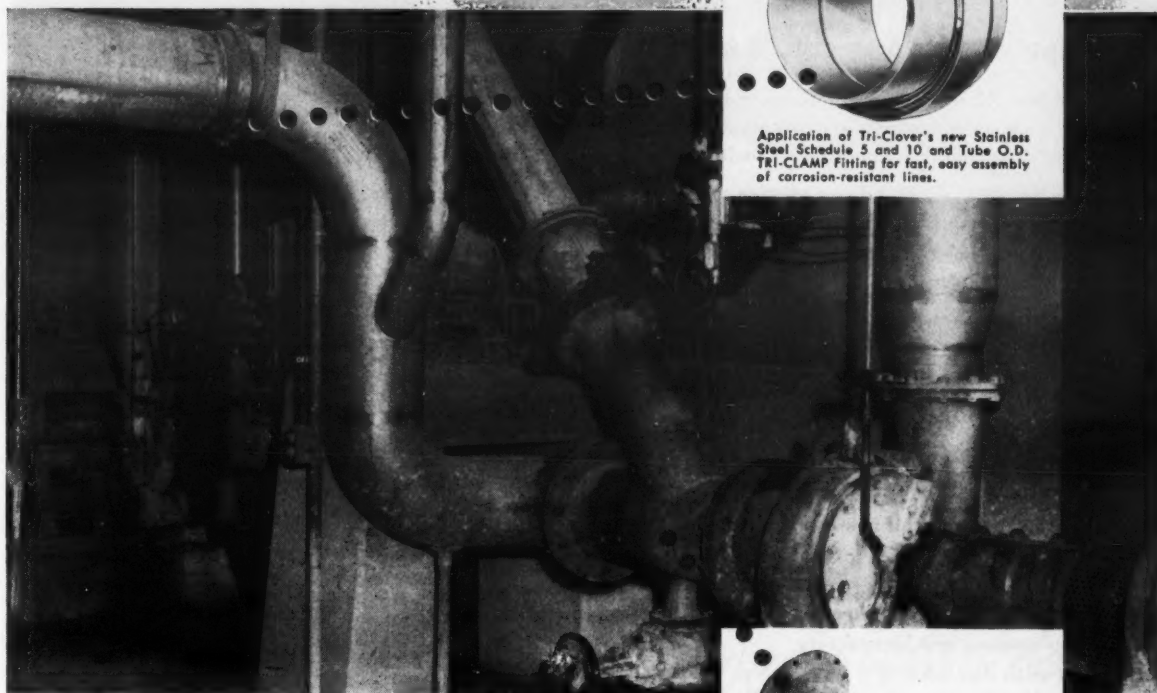
Protective inorganic finishes that actually change the structure and composition of metal surfaces are described in four-page bulletin. Steel, zinc (galvanized iron), aluminum, magnesium, titanium, copper, copper alloys, and stainless steel can react with applied chemical solution to form a non-metallic film which is an integral part of the treated metal. Film can improve paint adhesion, provide protection against corrosion, increase lubricity of friction surfaces, aid metal forming operations, and serve as decorative finishes on many products.

"Metal Protection and Paint Bonding" is issued by American Chemical Paint Co., Dept. CP, PO Box 301, Ambler, Pa. When inquiring specify CP 6296 on the convenient Reader Service slip located opposite last page.

Complex piping problems easily solved with "Standard"

# TRI-CLOVER

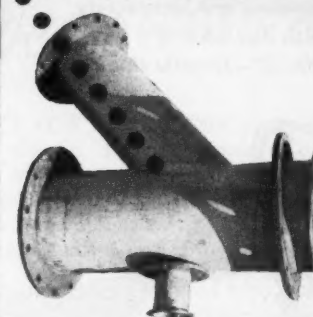
## STAINLESS STEEL FITTINGS



Application of Tri-Clover's new Stainless Steel Schedule 5 and 10 and Tube O.D. TRI-CLAMP Fitting for fast, easy assembly of corrosion-resistant lines.

• Shown here are part of the stainless steel fittings manufactured by Tri-Clover to meet the requirements of a large Midwest Paper Company. The units shown above are part of the Vortrap assemblies, and include Tri-Clover "standard" stainless steel fittings to provide maximum corrosion-resistance.

Experience and craftsmanship make the big difference in the production of long-lasting, fully corrosion-resistant fittings. That's why more and more mills and plants in the chemical-process industries are specifying TRI-CLOVER . . . for the highest quality stainless steel fittings, pipe, tubing and pumps.



"Standard" Tri-Clover Stainless Steel 45-degree Lateral Fitting designed for flanged assembly . . . one of a complete line of industrial fittings for every purpose, in sizes up to 36" O.D.

**LADISH CO.**  
*Tri-Clover Division*  
Kenosha Wisconsin

See your nearest TRI-CLOVER DISTRIBUTOR  
EXPORT DEPARTMENT — 8 SO. MICHIGAN AVE.  
CHICAGO 3, U.S.A.

When inquiring check CP 6297 opposite last page

*At last!*

## A TRUE VINYL MASTIC!

**Complete protection in a single coat—10 mils thick.**

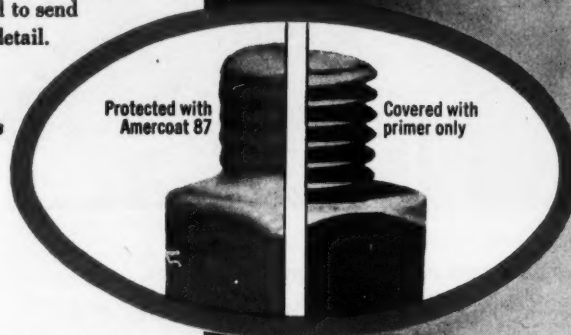
**Amercoat No. 87** will cut your maintenance costs because one coat gives you the thickness and protection previously available only through the application of multiple coats.

**Amercoat No. 87** is the brand new solution to an old problem, for it combines the time-tested chemical and weather resistance of a vinyl with the extra thickness that was heretofore available only in conventional mastics.

**Amercoat No. 87** is easily applied with standard industrial spray equipment. Only one cross-spray coat, over a primed surface, is required for complete protection. Because **Amercoat No. 87** is a true vinyl, it is not limited to black, but is available in a variety of colors.

You can save up to 50% of your labor costs with **Amercoat's** new vinyl mastic No. 87. We will be pleased to send you a bulletin describing this new coating in detail.

**Notice that the sharp bolt threads, welds and sharp corners are completely protected with one coat of Amercoat No. 87—10 mils thick!**



**Amercoat**

**CORPORATION**

Dept. P,  
4809 Firestone Blvd.,  
South Gate, California

EVANSTON, ILL. • KENILWORTH, N.J. • JACKSONVILLE, FLA. • HOUSTON, TEX.

When inquiring check CP 6298 opposite last page

## CORROSION CONTROL

**Corrosion caused by dissolved oxygen in boiler feedwater reduced by use of hydrazine . . .**

beneficial results obtained without harm to boiler operation

In two technical papers recently presented it was shown that corrosion caused by dissolved oxygen is being reduced by the use of hydrazine. Applications in several power plants indicate that this is being accomplished without undesirable effects on boiler operation. Maintenance of a hydrazine residual in the water protects the boiler without interfering with the normal control of pH and without contributing to the total solids content.

Practical experience has indicated that, upon initiating hydrazine treatment, the amount added should not exceed three times the equivalent oxygen content of the deaerated feedwater. Cleanliness of the boiler has a direct effect on the speed with which the initial hydrazine residual is established.

Hydrazine is applied in aqueous solutions. A small chemical proportioning pump provides a simple way to inject dilute hydrazine hydrate into feedwater line against back pressure with positive control. Formation of ammonia is avoided by limiting hydrazine dosages. Conductivity of the condensate is useful as an indirect control on hydrazine dosages.

(Information obtained from two technical papers given before the 1954 annual meeting of the American Society of Mechanical Engineers. One paper was prepared by Richard C. Harshman and Eric R. Woodward, Olin Mathieson Chemical Corp. Author of the other paper was Jack Leicester, Admiralty Materials Laboratory, Dorset, England.)

(For further information on the use of hydrazine in treating boiler feedwater contact Olin Mathieson Chemical Corp., Dept. CP, Mathieson Bldg., Baltimore 3, Md. Check CP 6299 opposite last page.)

**Stainless steel, other metals with controlled porosity**

Properties of available porous metals, including Type 304 and 316 stainless steels, nickel, Monel, Stellites and other alloys are presented in 45-page spiral-bound booklet. Included are data on various porous stainless steel filter elements and containers and their laboratory and plant-scale application.

"Data on Porous Stainless Steel, Alloys" is issued by Micro Metallic Corporation, Dept. CP, 30 Sea Cliff Ave., Glen Cove, N. Y. When inquiring check CP 6300 opposite last page.



# agilene

(POLYETHYLENE)

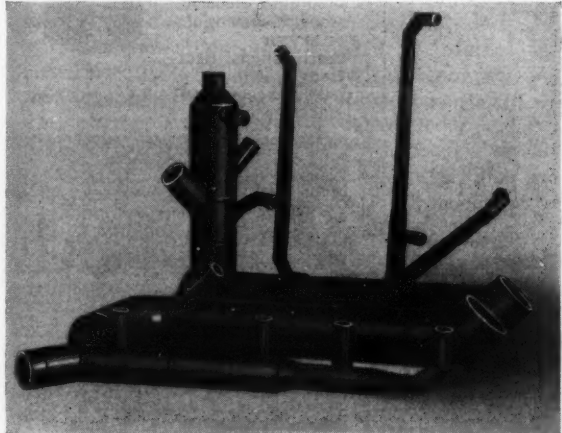


# agilide

(NON-PLASTICIZED)  
(POLYVINYL CHLORIDE)

improved non-corrosive plastics for fabrication of chemical processing equipment

Agile's high-grade modern thermoplastic construction materials—AGILENE and AGILIDE—fabricated by a unique combination of forming and welding processes in which we specialize, are your safeguard for an economical and properly engineered installation.



**Seamless, corrosion-proof, 1/8 the weight of steel**—These are the outstanding features of AGILENE (polyethylene) ducting.

The pre-fabricated sections pictures above are constructed by hot gas welding from AGILENE seamless centrifugally cast tubing, to be used for complete fume exhausting from plating operations. In conjunction with an AGILENE centrifugal fan, corrosion free operation is assured for years to come.

## American Agile Corporation

Plant and General Offices • 3461 Dunham Rd., Maple Heights, Ohio  
Marketing Address: P. O. Box 148 • Bedford, Ohio

DEPT C-1

When inquiring check CP 6301 opposite last page  
APRIL, 1955

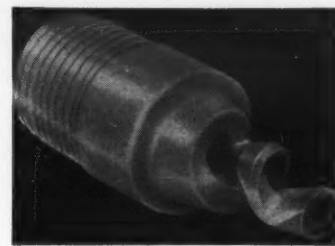
## CORROSION

**Low-cost spray nozzles fabricated from Teflon resist corrosion . . .**

simple design serves to prevent clogging

**Uses:** Industrial spray applications.

**Features:** Nozzles are made of Teflon and are non-clogging, corrosion-resistant with practically any spray, and long-wearing. Simplicity of design keeps cost down.



Nozzles available with flow rates from 5 to 50 gpm

**Description:** Teflon spray nozzles are available in ten models with narrow angle (50°) or wide angle (120°) hollow cone spray pattern in five different flow rates from 5 to 50 gpm. They are threaded with 3/8 or 1/2" male pipe threads.

(TF Series Teflon spray nozzles are products of Bete Fog Nozzle Inc., Dept. CP, 309 Wells St., Greenfield, Mass. . . check CP 6302 opposite last page.)

### Shows stainless steel gate valves

Schematic drawings of various stainless steel gate valves are pictured in four-page catalog. Included is a section on design factors, a discussion of construction materials, standards, and quality control measures.

Bul 55G is issued by The Cooper Alloy Corp., Dept. CP, 150 Bloy St., Hillside 5, N.J. Check CP 6303 on handy form opposite last page.

**GIVES YOU BEST Performance**  
**Because it's Best Suited to the Job**



**WELDCO**  
**Always Meets Your Specifications**

**TO GET TOP-QUALITY PIPE and TUBING** made to your individual needs, it's always good business to specify Weldco. For Weldco is produced by specialists—men who have the equipment, facilities and experience to manufacture pipe and tubing to your exact specifications. Then it's carefully finished, accurately sized, and rigidly inspected.

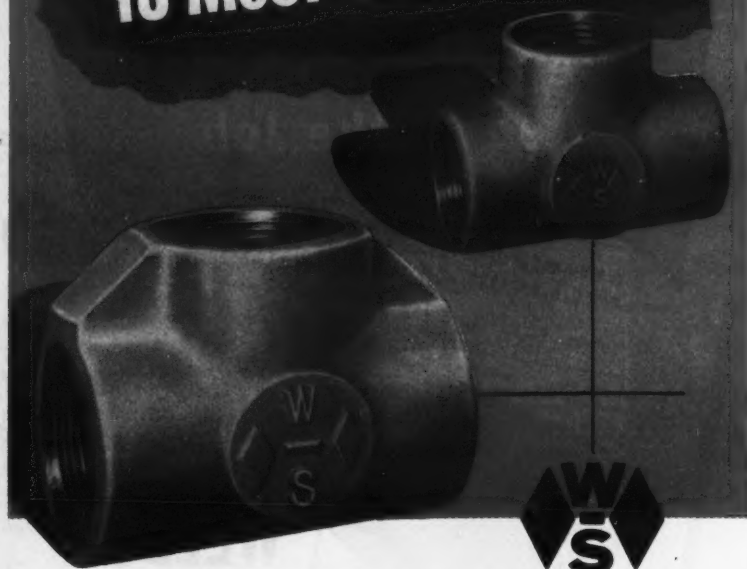
And only WELDCO is automatically welded with the exclusive Double-Fusion process! WELDCO is available in Stainless Steel, Monel, Inconel, Nickel, Cupro-Nickel, and Hastelloy, in tube and pipe sizes from 3" to 30", Schedules 5 and 10, and 3" to 12", Schedule 40. To insure top performance and long service life, make Youngstown Welding your tubing headquarters. A letter or phone call puts our 39 years of specialized experience to work for you.

Whatever Your Needs In Tubing . . . You're Way Ahead With WELDCO

**THE YOUNGSTOWN WELDING & ENGINEERING CO.**  
3712 OAKWOOD AVE. • YOUNGSTOWN 9, OHIO

When inquiring check CP 6304 opposite last page

**ADDED TO OUR LINE  
to Meet Your Needs**



## **New WATSON-STILLMAN 150 LB. STAINLESS STEEL PIPE FITTINGS, Types 304, 316**

Now you can get performance-proved Watson-Stillman Fittings for standard pressure services that need the corrosion resistance, heat resistance and low temperature toughness of 18-8 Stainless Steel.

W-S 150 lb. Stainless Fittings, rated at 400 psi cold non-shock working pressure and 150 psi steam pressure, are ideal for process piping, refrigeration systems, high temperature liquid and gas piping and other piping systems. They are available in both Screw-End and Socket-Welding Types in sizes  $\frac{1}{2}$ " to 2".

The new Watson-Stillman Stainless Steel Fittings will assure you of long, trouble-free service in tough piping applications... will reduce down-time and cut maintenance costs. For full technical information on these fittings write today for Bulletin S-3-55.

**Sold Through Leading Distributors**

## **WATSON-STILLMAN FITTINGS DIVISION**



**H. K. PORTER COMPANY, INC.**  
Roselle, New Jersey

10

When inquiring check CP 6305 opposite last page

## **CORROSION CONTROL**

**Fluid handled is isolated  
from all moving parts  
of sanitary pump...**

"squeegee" action of flexible liner does job

**Uses:** Handling viscous materials or abrasive slurries as well as for pumping food products, pharmaceuticals, and chemically pure fluids.

**Features:** Fluid handled by unit is isolated from all moving parts. Material used in pump will not contaminate fluids handled and resists corrosion by them.

**Description:** Sanitary pump has no stuffing boxes, shaft seals, check valves, or gaskets. Fluid is moved by "squeegee" action of a molded flexible liner within pump. Gentle pumping action prevents churning or foaming of fluid.

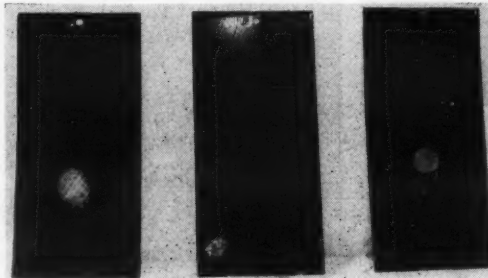
(Sani-Flex sanitary pump is a product of Vanton Pump & Equipment Corp., Dept. CP, Empire State Bldg., New York 1, N. Y. . . or for more information check CP 6306 on handy form opposite last page.)

**Makes coatings resistant  
to many corrosives...**

intermediate has excellent storage life, is essentially 100% polymerizeable

**Uses:** In coatings for drum interiors, tank cars, water tanks, chemical tanks, process equipment, and the like.

**Features:** Protective coatings formulated with this intermediate show excellent resistance to al-



After short-time exposure to caustic soda, center panel coated with R-108 formulation shows only a slight discoloration, while materials on other panels disintegrated

kalis, acids, and other corrosive chemicals over a wide temperature range. Resistance to salt spray is said to be exceptional.

Intermediate has excellent storage life. It is compatible in a wide range with many other coating resins such as polyvinyl butyrals, alkyds, epoxys,

Uniform  
Class 3 Fit

**BOLTS  
NUTS  
STUDS**



## **TITANIUM**

- Carbon Steel
- Alloy Steels
- Stainless Steels
- Silicon Bronze
- Naval Brass
- Monel Metal

You can depend on a uniform Class 3 fit if required when you buy Pawtucket threaded fasteners. Standard items or specialties — all Pawtucket products are accurately made in standard dimensions or to your specifications. Heat treating with precision-controlled modern equipment.



BETTER BOLTS SINCE 1882

**PAWTUCKET**

**MANUFACTURING COMPANY**  
327 Pine St. • Pawtucket, R. I.  
THE PLACE TO SOLVE YOUR BOLT PROBLEMS  
T.M. REG.  
"The Bolt Man"

When inquiring check CP 6307  
opposite last page

CHEMICAL PROCESSING

cellulose  
Descript  
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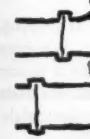
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APRIL,



celluloses, phenolics, urea and melamine resins.

**Description:** Coating intermediate, designated R-108, is based on phenol derivatives. In addition to its chemical resistance, intermediate imparts to coatings extreme toughness, flexibility, and resistance to marring and abrasion.

Density	1.15-1.20
Solidification Point (°F) Below	—50
Boiling Point (°F)	Approx 400
Molecular Weight (Aprox)	200
Refractive Index ( $n_D^{25}$ )	1.567
Color	Clear brown
Viscosity (cp @ 25°C)	2000-4000
Free Water Content (%)	2-4

(Coating intermediate is a product of Chemical and Metallurgical Division, General Electric Company, Dept. CP, One Plastics Avenue, Pittsfield, Mass. . . . or check CP 6308 opposite last page.)

**Line of plastic tanks, stacks, ductwork made of material suited to end use**

Complete line of reinforced plastic structures such as standard sized tanks, stacks, and ductwork has been announced as available. Reinforced plastic structures are selected and designed for specific applications by engineering department. The plastics, which are distributed under the trade name Plastaloy, are available with both glass mat and glass fabric reinforcement.

(For more information contact The Atlas Mineral Products Co., Dept. CP, Walnut St., Mertztown, Pa. . . . or check CP 6309 opposite last page.)



For better ways to whip corrosion . . .

. . . try the handy Product Directory (starting this issue on page 237). You'll find it an easy "page-locator" for ideas, materials, and services.



## You can see why SARAN LINED PIPE KEEPS SHUTDOWNS TO A MINIMUM

**It's made of corrosion-resistant saran pipe swaged into strong, rigid, nonbursting steel. And every piece is spark tested before you buy!**

Unscheduled shutdowns are a thing of the past when you use saran lined pipe, fittings and valves to convey corrosive liquids. This modern, trouble-free piping is corrosion resistant . . . forms tight, snug, leakproof joints . . . won't burst under pressures up to 150 psi. And every single piece of saran lined pipe is carefully spark tested by hand to be sure that there are no pinpoint holidays or cracks in its lining. Cast steel lined fittings are available for higher pressures.

Installation costs are surprisingly low with saran lined pipes, fittings and valves, too. They can be cut and

threaded in the field with standard pipe-fitter's tools. Their rigidity means few supporting members are needed.

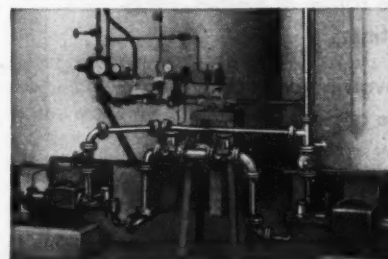
If you want to convey acids, alkalis, or other corrosive liquids at low over-all cost, be sure to investigate saran lined pipe. Contact the Saran Lined Pipe Company, 2415 Burdette Avenue, Ferndale 20, Michigan, Department SP528B.

### RELATED SARAN PRODUCTS

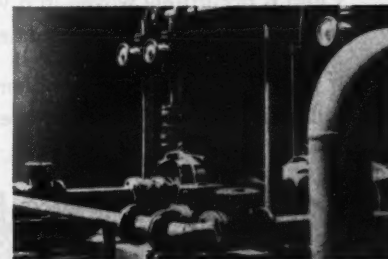
Tank lining • Saran rubber molding stock • Saran tubing and fittings • Saran pipe and fittings.

### SOME OF THE MANY INSTALLATIONS USING SARAN LINED STEEL PIPE

*Saran Lined Pipe is Manufactured by  
The Dow Chemical Company  
Midland, Michigan*



A large Southeastern paper mill uses saran lined pipe to handle corrosive alum solution. It has proved to be an exceptionally satisfactory answer to eliminating unscheduled shutdowns.



This installation of a large Midwest company has conveyed highly corrosive hydrochloric acid for over seven years. The joints have remained as tight and leakproof as new.

you can depend on **DOW PLASTICS**

**DOW**

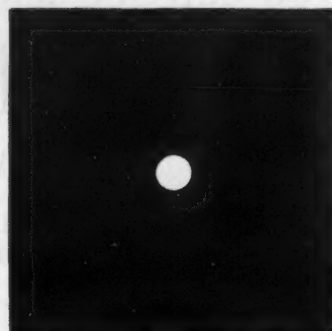
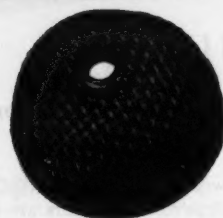
When inquiring check CP 6310 opposite last page

## Anti-Corrosive WIRE CLOTH

- STAINLESS STEEL
- "NICHROME"
- "MONEL"
- PHOSPHOR BRONZE

for

- FILTER CLOTH
- SPECIAL PARTS
- STRAINERS
- SIEVES
- TRAPS
- SCREENS



Are you using wire cloth or wire cloth parts which must be corrosion resistant? Are the service conditions in your plant really tough? If you have a problem selecting the proper anti-corrosive alloy, Newark Wire Cloth may have the answer.

Available in all corrosion resistant metals, Newark Wire Cloth is accurately woven in a wide range of meshes, ranging from very coarse to extremely fine.

If you have a wire cloth problem involving corrosion, please tell us about it . . . we may have the answer.

**NEWARK**  
for ACCURACY

A complete line of woven wire cloth and wire cloth parts in all malleable metals.

Send for Catalog &

**Newark  
Wire Cloth  
COMPANY**

351 VERONA AVENUE • NEWARK 4, NEW JERSEY

When inquiring check CP 6311 opposite last page

## CORROSION

**Cadmium and chrome thermocouple head won't corrode**

Lightweight (3½ oz), watertight thermocouple head is chrome plated outside and cadmium plated



inside for corrosion resistance. Unit accommodates from 30 to 14 gage wire. It has a maximum operating temperature of 200°F. Easily-assembled (screws loosened, not removed), the unit is only 2-5/32" long by 1-1/8" diam.

(Thermocouple heads are products of Conax Corporation, Dept. CP, 4515 Main St., Buffalo 21, N. Y. . . . or for more information check CP 6312 on handy form opposite last page.)

## Problems, prevention of corrosion

Survey of problems and prevention of corrosion in the chemical and petrochemical industries in the United States is presented in 134-page booklet. Subjects covered in detail include corrosion economics, anti-corrosion research, testing and inspection, protective techniques, and anti-corrosive and heat-resisting materials.

TAR/130 (54)1, "Corrosion Problems and Prevention . . ." is available at \$1.50 the copy from The Organization for European Economic Cooperation, Dept. CP, 2002 P St., N. W., Washington 6, D. C. Check CP 6313 opposite last page.

## TYGON GASKETS

**Resist  
CHEMICAL  
ATTACK**



Tygon plastic is tops for gasketing in acid handling service. Tough, flexible, highly resistant to acids and alkalis. Available in sheets, tubes or solid cord from which you can cut your own gaskets quickly and inexpensively.

Plastics and Synthetics Division

**U. S. STONWARE**

Akron 9, Ohio

When inquiring check CP 6314 opposite last page

WRITE  
for  
BULLETIN  
G-520

**NEW**

**Carpenter Titanium Tubing**  
Helps Keep Jets Airborne . . .



**It may help you!**

Carpenter Titanium Tubing is light. It's strong. It has a remarkable endurance limit. Weighing about 56% as much as high alloy steel, titanium has a tensile strength that compares favorably with many steels. It possesses an endurance ratio well above both steel and non-ferrous metals.

Carpenter Titanium Tubing is highly resistant to most corrosives, salt water and salt atmospheres. Its extreme resistance to erosion and cavitation is unique among metals. Yet, with all this, Carpenter Titanium Tubing is ductile, may be successfully machined.

Perhaps the advantages of Carpenter Titanium Tubing can help you solve design and production problems. Would you like to know more about it?

**THE CARPENTER STEEL COMPANY**

Alloy Tube Division, Union, New Jersey

When inquiring check CP 6315 opposite last page

CHEMICAL PROCESSING

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**Calendered rigid PVC sheet  
especially adapted to tank  
and duct production . . .**

sheets as large as  $4\frac{1}{2} \times 10'$  can be used and are easily welded or machined

**Uses:** For production of structures such as self-supporting electroplating tanks, ducts and exhaust hoods for corrosive fumes, and laboratory ware such as beakers, bottles, and funnels for handling, storing and transporting corrosive liquids and solids.

**Features:** Material has high impact, tensile, flexural, and welding strengths, combined with excellent resistance to chemicals and moisture, and a high heat distortion point. It meets SPI specs for Type I rigid sheet for structural purposes.

**Description:** Calendered rigid polyvinyl chloride sheet is easily machined and fabricated, facilitating construction with sheets as large as  $4\frac{1}{2} \times 10'$ . Sheet is self-extinguishing. Tests have shown its ability to withstand 750 to 1000 hours exposure to sub-tropical sunlight before blackening.

Sheets are produced in both natural unpigmented and opaque PVC in thicknesses from .010 to .015" in continuous rolls up to  $51\frac{1}{2}"$  wide. Planished sheets measuring  $20 \times 50'$  are available up to  $1\frac{3}{4}"$  thick.

(Calendered rigid polyvinyl sheet is a product of Bakelite Company, a Division of Union Carbide and Carbon Corporation, Dept. CP, 260 Madison Ave., New York 16, N. Y. . . . or for more information check CP 6316 on handy form opposite last page.)

**Concrete protected from fluorides,  
hydrofluoric acid, hydrofluoric  
acid solutions . . .**

thermosetting plastic-base surfacing forms impervious monolithic membrane

**Uses:** Applications where resistance to abrasion, impact, and acid solutions are important.

**Features:** Lining furnishes low-cost protection of concrete from fluorides, hydrofluoric acid and hydrofluoric acid solutions.

**Description:** This thermosetting plastic-base surfacing can be applied to floors, trenches, tank bases, and other concrete structures. It provides an impervious monolithic membrane protecting the concrete. In many applications, the lining has been used to replace brick.

(Ceilcrete B corrosion-resistant lining is a product of The Ceilcrete Co., Dept. CP, 4834 Ridge Rd., Cleveland, Ohio. . . . or check CP 6317 on handy form opposite last page.)



## CRANE VALVES have longest life in this sulphur pit

**THE CASE HISTORY**—Leakage in steam lines to sulphur pit heating coils was hindering operations at International Minerals & Chemical Corp. plant at Lockland, Ohio. The condition prevented servicing of traps, strainers and the heating coils.

Valves that leaked beyond repair after as little as 6 months' service were the source of the trouble. Their seating as well as packing failed to stand up.

In January, 1953, after trying other types, Crane  $14\frac{1}{2}$ P Plug Type Disc Globe Valves were installed. Today, they're still giving excellent service at low cost. Recently, the steam piping was completely replaced—the Crane valves were repacked and put back in the lines. That's all the maintenance they needed after 18 months in this severe service.

**Crane 150-Pound No.  $14\frac{1}{2}$ P  
Plug Type Disc Brass Valves**

Long-wearing, hard seating surfaces in a rugged, well-proportioned, Crane-designed body make these valves exceptionally suited for steam and other severe services. Consult your Crane Catalog or your Crane Representative.



# CRANE CO.

General Offices: 836 S. Michigan Ave., Chicago 5, Illinois  
Branches and Wholesalers Serving All Industrial Areas

**VALVES • FITTINGS • PIPE • PLUMBING • HEATING**

**CRANE'S FIRST CENTURY . . . 1855-1955**

When inquiring check CP 6318 opposite last page

If your operation  
is rough on tanks  
and pipes—interior  
and exterior—then  
you should know

about

**VALPON**  
ENAMEL

MADE WITH **SHELL'S FAMOUS**  
**EPON RESINS**

**Invulnerable to**

OILS { ANIMAL  
VEGETABLE  
MINERAL

AND CAUSTICS...  
with a new measure of  
**resistance to**

**ABRASION, ACID  
& ALKALI SOLUTIONS  
AND CORROSION**



In suitable industrial colors  
and black and white.

If you'd like to know more about  
Valpon, mail your request on  
your regular letterhead to the  
address shown below.



**VALDURA HEAVY DUTY PAINT DIVISION**

**AMERICAN-MARIETTA CO.**  
101 E. Ontario St., Chicago 11, Ill.

When inquiring check CP 6319 opposite last page

## CORROSION CONTROL

### Line of plastic pipe covers every need

Four kinds of polyethylene pipe now produced by company are said to provide for choosing the right pipe for every installation.

Four types available are: Pressur Tex, designed for high working pressures and available in ratings of 75 and 100 psi; Twin Tex which combines two pipes in one unit for fast, easy piping of jet wells; Standard Wall for all-purpose use with water; and Yello Tex, an easy-to-see pipe for use with industrial wastes and corrosive fluids.

All four types of pipe are corrosion-resistant and Measure Marked every ten feet.

(Measure Marked plastic pipe is a product of The Plastex Co., Dept. CP, 402 Mt. Vernon Ave., Columbus 3, Ohio . . . or for more information check CP 6320 on handy form opposite last page.)

### Installation illustrates resistance of zirconium to HCl . . .

metal also exhibits excellent performance with variety of other chemicals

Hydrochloric acid is resisted in all concentrations up to 100°C by zirconium now commercially available. An example of how well the metal withstands HCl is shown in accompanying photograph. As shown, coated steel fan on left failed after eight months service while zirconium fan on right has no visible deterioration after 10 months in same service. Material is also fully resistant to sea water and water saturated with chlorine.



While coated steel fan on left failed after several months service exhausting HCl, zirconium fan on right is still untouched under same conditions

Nitric acid is withstood by zirconium nearly as well as hydrochloric. Corrosion rate is less than .9 mils per year up to 100°C. While maximum corrosion rate of .86 mils takes place at 50% concentration at room temperature, loss at 100°C with concentrated nitric is less than .12 mils per year.

Sulfuric acid at 75% concentration causes a loss

The **VALDURA** name stands for a complete line of specialized industrial maintenance products designed to serve every type of American industry. Typical products are indicated below Other Valdura Specifics and Exclusives will be identified in future ads. Watch for them! They can solve your toughest maintenance problems.



Val-Chem serves as the perfect primer for Valpon or any of the Valdura finishes incorporating chemical resistance. It provides speedier drying and a vastly superior bond.

Tank-White combines maximum resistance to weathering and industrial fumes, and an extra measure of gleaming, prideful beauty.



If you have a particular maintenance problem which is urgent just describe it on your regular letterhead and mail to the address below. Your inquiry will be treated as an invitation to provide service . . . not as a license to exert selling pressure!



**VALDURA**  
HEAVY DUTY  
PAINT DIVISION  
AMERICAN-MARIETTA CO.  
101 E. Ontario St., Chicago 11, Ill.

When inquiring check CP 6321  
opposite last page

CHEMICAL PROCESSING

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of only 1.11 mils per year at room temperature. At 60°C and 75% concentration, corrosion rate is 3.71 mils per year. In sulfurous acid, zirconium is fully resistant in boiling solutions.

Phosphoric acid is resisted by zirconium at all concentrations up to 60°C. At 100°C full resistance is exhibited at 60% concentration. In boiling phosphoric acid, an attack of 7.29 mils per year takes place at 60% concentration.

Hydrofluoric acid rapidly attacks zirconium.

Other materials such as alkaline solutions and fused alkalis, salts, organic compounds, and chloride solutions are resisted by zirconium.

(For further information on zirconium contact The Carborundum Co., Dept. CP, Niagara Falls, N. Y. Check CP 6322 opposite last page.)

#### Low-friction, Teflon fiber packing handles hot corrosives



Low-friction packing for hot corrosives has been developed to withstand such chemicals as fuming acid, concentrated sulfuric, Oleum or concentrated sodium hydroxide, and even aqua regia at temperatures up to 550°F.

(Super-Lon corrosion-resistant packing is a product of A. W. Chesterton Co., Dept. CP, 2 Ashland St., Everett 49, Mass. . . or for more information check CP 6323 opposite last page.)

#### Non-sacrificial cast iron anode — test results

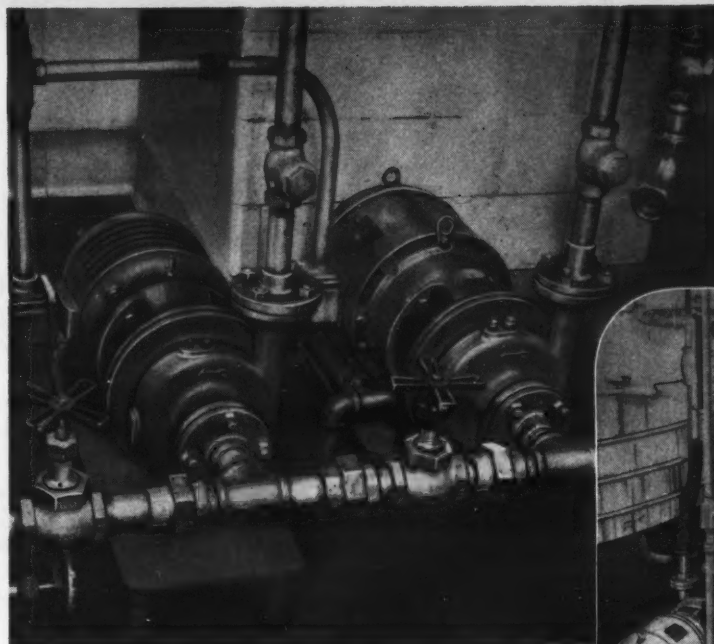
Results of original work on evaluation of a high-silicone cast iron as a non-sacrificial anode are summarized in four-page reprint. Iron discussed is not limited to a low current density in an aqueous environment.

"Duriron Impressed Current Anodes" is available from The Duriron Company, Inc., Dept. CP, 450 N. Findlay St., Dayton 1, Ohio. Check CP 6324 on handy form opposite last page.

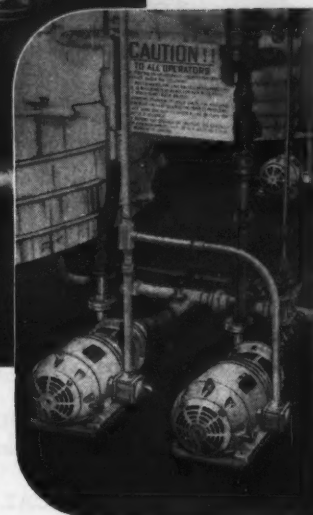
Ampco Centrifugal Pumps, made of Illium "G", pumping vinegar to automatic measuring devices in the Mayonnaise and Miracle Whip Processing Dept., Kraft Foods Co., Chicago, Illinois.

Ampco Pumps are available in most workable alloys. When made from corrosion- and wear-resistant Ampco Metal, they give you all the advantages of a special pump at standard pump prices.

Illium "G" is the registered trademark of the Illium Corp.



Ampco Pumps handling vinegar from tank cars to storage, Kraft Foods Co., Chicago.



## Seven reasons why Kraft Foods Co. uses . . . **AMPCO** Centrifugal Pumps

- 1 Good corrosion-resistance
- 2 Low capital investment
- 3 No metal-to-metal contact
- 4 High efficiency
- 5 Constant rate of flow
- 6 Durable metallic seals that resist wear — are easy to replace
- 7 Small space requirements

**K**RAFT uses corrosion-resistant Ampco Centrifugal Pumps to handle the vinegar used in the production of its mayonnaise and salad dressing. These pumps give a dependable flow rate . . . freedom from contamination . . . greater dependability . . . less downtime.

Moreover, Ampco Pumps are used throughout industry for difficult liquid-handling problems. They represent pump design at its best — both hydraulic and mechanical. They save power — have wide performance range, good characteristics, high efficiencies (up to 85%). They save money — you get a special pump at a standard pump price. They're built of Ampco Metal — the special alloys that make good where other metals fail. That's why they're unusually resistant to wear, corrosion, erosion,

cavitation-pitting, and deformation. That's why you get a pump that will successfully handle abrasive solids in suspension or viscous liquids.

Best of all, Ampco Pumps are production-built, competitively-priced in a wide range of sizes. You can get them not only in Ampco Metal, but also in Illium "G" or other workable alloys to meet the requirements of unusual jobs.

Put these standard units to work for you — give them the tough jobs that formerly required high-priced special pumps. Take advantage of low-cost, long-life, headache-free pumping. Check with your nearby Ampco distributor or write us for the solution to your difficult fluid-handling problems. \*Reg. U. S. Pat. Off.

Clip this coupon to a postcard and mail today.



AMPCO METAL, INC., Dept. CP-4, Milwaukee 46, Wisconsin

- ☐ I'm interested in Ampco Centrifugal Pumps. Send me bulletin No. P-3a.
- ☐ I'd like to know more about Ampco Metal for use in process industries. Send me more information.

Name.....Title.....

Company.....

Company Address.....

City.....(.....) State.....

PR-14A

When inquiring check CP 6325 opposite last page



## for Chemical Processing Advertisers\*

The emblem at right is that of NBP—National Business Publications. You've probably seen it before on our contents page . . . rate card . . . or heading the **CHEMICAL PROCESSING** listing in **Standard Rate & Data**. Because we're proud of it.

It signifies that **CHEMICAL PROCESSING** has qualified for membership in the largest association of technical, scientific and professional journals in the United States. (We're proud, too, that our C.P. executive staff includes a past president of NBP and a member of its Board of Directors.)

But belonging to NBP is more than a feather in our publishing cap. It's an important *plus* for every advertiser in **CHEMICAL PROCESSING**. Here are the membership requirements. Judge for yourself:

- Unbiased editorial content
- Periodic reader interest evaluation
- Non acceptance of questionable advertising
- Periodic audit of circulation
- Uniform rates to all advertisers

In addition, NBP provides the framework for a continuing exchange of ideas among member publishers. The result: continuing improvement in publishing practices to make **CHEMICAL PROCESSING** more useful to its readers . . . more productive for its advertisers.

★ Courtesy of the publication **MEDICAL ECONOMICS**, creator of this copy, here adapted to **CHEMICAL PROCESSING**.



## Chemical Processing

For men who manage  
the Chemical Processing Industries

Published by Putman Publishing Company

Creators of **PUTMAN-STYLE** Magazines  
... terse, vital editorial; "hand-picked" circulation;  
square, high-visibility format; quality readership;  
hence more **READER ACTION**



## packaging



In handling inorganics, these polyethylene jars and bottles —

### Minimize permeability

*Designed for holding acids and other corrosives, containers are of all-welded, heavy-wall construction*

**Uses:** Storage, shipment, and handling of acids and other corrosive liquid or solid substances that are moisture sensitive or otherwise easily contaminated.

**Features:** Where handling inorganics is concerned, containers minimize the problem of permeability. They are of all-welded, heavy-wall construction, fabricated from molded and cast sections.

**Description:** Polyethylene bottles and storage jars are light in weight yet are leak-proof and resistant to impact. Bottles are provided with a tight-closing screw cap. Jars have a tight friction-fitting, easily removable lid.

Ten standard sizes are available with capacities ranging from one quart to five gallons. Special sizes are available on order.

(Polyethylene bottles and storage jars are products of American Agile Corp., Dept. CP, PO Box 168, Bedford, Ohio . . . or for more information check CP 6326 on handy form opposite last page.)

### For flexible containers — here's a label that "gives"

To be used for identifying polyethylene or other containers made of flexible plastic or rubber, label "gives" and is not damaged when bottle is squeezed, but returns to its original shape when pressure is released. Labels can be applied by

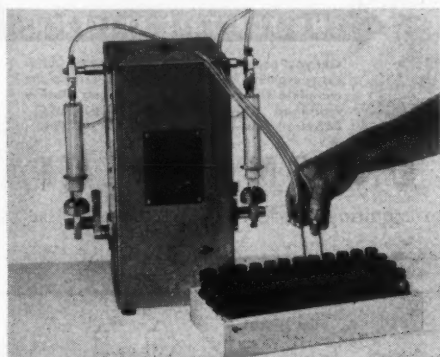


conventional methods, requiring no change in equipment.

(Flexible labels are a development of Fleetwood Press, Inc., Dept. CP, 1668 Boone Ave., New York 60, N.Y. . . . or for more information check CP 6327 on handy form opposite last page.)

### Doubles filling speed for small containers

Two-at-a-time filling of vials up to 50 cc in size permits production rates to 4800 fills per hour



**Uses:** Long- or short-run production filling of vials, ampules, plastic bottles and a variety of other small containers.

**Features:** Unit incorporates two filling pistons operating in tandem. Production rates up to 4800 fills per hour can be attained. Volume delivered by each piston can be adjusted independently of the other by means of graduated micrometer controls. Identical delivery volumes are thus assured. Volume delivery can be varied from .03 to 50 cc with an accuracy of  $\pm 1\%$ .

**Description:** Vial filler can be set up and readied for use in a matter of minutes. Each filling assembly may be removed easily for cleaning or sterilizing. Units use interchangeable glass syringes ranging in size from 1 to 50 cc. Variable filling speed at constant torque is provided by means of electronic control.

Accessories include a synchronizer (for operating two or more machines in tandem), a single stroke attachment, electric counter, and foot switch.

(Filamatic Model DAB vial filling machine is a product of National Instrument Co., Dept. CP, 5005 Queensbury Ave., Baltimore 5, Md. . . . or for more information check CP 6328 on handy form opposite last page.)

## For moving dry and viscous chemicals—

# We have the formula

Continental's steel containers give you the right combination of strength, lightness and convenience. Let our master lithographers add your name or trademark in glowing colors, and you have packaging that will do your chemical products proud.

Call on us for pails and drums in 2 to 12 gallon capacity, flaring pails that hold 3 $\frac{1}{2}$ , 4, 5 or 7 gallons; also 2 $\frac{1}{2}$  and 5 gallon utility containers. We're always ready to discuss special containers for special purposes. Let us tailor our service to your order.



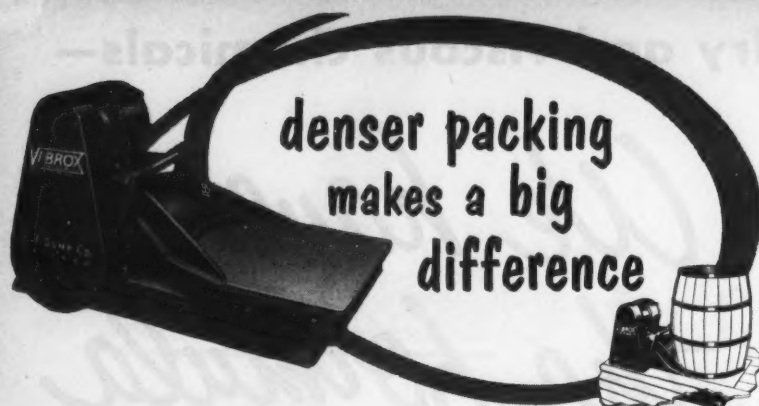
Besides light and heavy gauge steel containers, Continental makes a full line of "F"-style, plug top and conventional cans. Order all your needs at one time. Make up a mixed carload and save in warehouse space, shipping and inventory costs.



**CONTINENTAL CAN COMPANY**

Eastern Division: 100 East 42nd Street, New York 17  
Central Division: 135 So. La Salle Street, Chicago 3  
Pacific Division: Russ Bldg., San Francisco 4

When inquiring check CP 6329 opposite last page



The VIBROX Barrel and Drum Packer with the exclusive mechanical rocking-vibrating motion packs more material in the drum or barrel or permits the use of smaller containers; cuts packing time; and reduces packing labor as much as one-third. Yes, in packing most dry powdered, flake, or granular materials, the VIBROX Packer makes a big difference in the over-all packing costs—big enough, many users say, to pay for the VIBROX in a few months.

Several sizes are available for packing boxes, cans, cartons, kegs, drums, and barrels having capacities of from 5 to 1000 pounds. Other models are used for packing bags weighing up to 150 pounds.

Complete information and recommendations on request. Write today.

0219



FEEDING • MIXING • SIFTING • GRINDING • WEIGHING • PACKING  
and PACKAGING EQUIPMENT FOR THE PROCESS INDUSTRIES

**B. F. GUMP Co.**

Engineers and Manufacturers since 1872

1344 S. Cicero Avenue, Chicago 50, Illinois

When inquiring check CP 6330 opposite last page

## EXACT WEIGHT Sacking Scales

... sack, weigh,  
and check ... in  
**ONE** operation



One simple operation does the work of three! One man can bag, weigh, and check as much as 100 tons of free-flowing materials per day from overhead hopper to foot-level conveyor. The saving in labor costs, together with the saving from elimination of over-weights, can pay for the installation. Simple to operate, has just two controls. It takes just four easy motions to attach a bag, fill it, and release to conveyor. Model 2229, shown, is designed for ceiling suspension. Others feature post, pedestal, and dolly mountings. Write for details.



**Exact Weight  
Scales**

Better quality control

Better cost control

**THE EXACT WEIGHT SCALE COMPANY**

905 W. Fifth Avenue, Columbus 8, Ohio  
In Canada: P.O. Box 179, Station 5, Toronto 18, Ont.

When inquiring check CP 6331 opposite last page

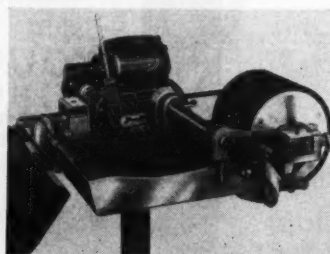
## PACKAGING

**Adhesion of safety paper  
to bottle mouths assured  
by coating unit . . .**

glue roller automatically raises  
if line stops

**Uses:** Placed in production line before capping station, unit applies a coating of glue to mouth of bottle to assure adhesion of safety paper seal on inside of cap.

**Features:** Machine is equipped with an attachment that automatically raises glue roller in event production line should stop. This device prevents adhesive from building up on bottle directly underneath glue roller. When line starts again roller automatically drops down into position and resumes application of adhesive.



Bottle top coater is synchronized  
with speed of bottling line

**Description:** Gluing machine, or bottle top coater, can handle bottles of varying heights by simple adjustment that raises or lowers glue roller mechanism.

Variable-speed control provides perfect synchronization with speed of bottling line. Turning of glue roller is instantly adjustable to desired speed of bottling operation.

To facilitate cleaning of bottle top coater, machine is designed to readily remove entire unit. Roller and tank can be slid off its mounting and placed in a pail of solvent or under a water faucet, depending on glue used.

(Gluing machine is a product of Potdevin Machine Co., Dept. CP, 285 North St., Teterboro, N. J. . . . or for more information check CP 6332 on handy form opposite last page.)



Left—  
Union Special  
Style 20100 H  
Bag Closing  
Machine

**Here's how  
to close  
MULTIWALL  
PAPER  
BAGS**

**FOR** lower production costs  
...stronger, neater closures  
...ability to get out rush orders  
in a hurry, you can't beat Union  
Special Bag Closing Machines! Specially built to stand  
up under heavy production schedules, these machines  
provide the high output rates needed to meet modern  
competitive conditions.

In the Union Special line, it's easy to find the right  
unit to meet your particular requirements.  
**ASK FOR RECOMMENDATIONS.**

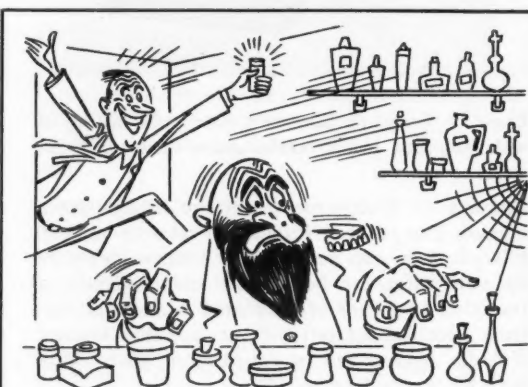


**SEND FOR THIS BULLETIN!**

Get your copy of this 16 page illustrated bulletin containing helpful data and charts on the complete Union Special line of bag closing machines. **UNION SPECIAL MACHINE CO.**, 442 North Franklin Street, Chicago 10, Illinois

**UNION SPECIAL**

When inquiring check CP 6333 opposite last page



**"Stop searching Beardsley!"**

**We've just discovered Clearsite Plastic Containers."**

Moisture-tight! Dust-proof!  
Non-toxic! Just three of many  
reasons why Clearsite makes an  
ideal container. Available in  
many sizes and varieties of  
closures. Any trade-mark or label  
can be multi-color printed right  
on the feather-light, shatter-  
proof container.

Write for free samples and  
descriptive literature.

**CELLUPLASTIC  
CORPORATION**

General Offices:  
48 Avenue L, Newark 5, N. J.



When inquiring check CP 6334 opposite last page

CHEMICAL PROCESSING



**Net-weighs, fills any non-liquid that will go through hopper . . .**

vibrating feeder assures accurate dispensing

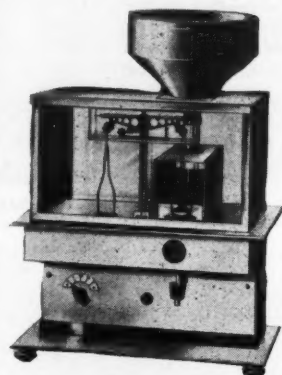
**Uses:** For automatic net-weighing and dispensing into containers of any non-liquid product that will pass through a hopper.

**Features:** Unit has no stirrers or agitators of any kind and no mechanical cut-off. Hence, there can be no crushing or damage to articles being dispensed. A vibrating feeder insures accurate dispensing, even with hygroscopic and fatty, non-free flowing powders. A dustproof casing protects operator from dust.

**Description:** Weighing and filling machine, called the Filamatic Universal, operates by means of a precision beam balance which automatically net-weighs and dispenses product with an accuracy of  $\frac{1}{2}$  to 1%.

Operation is completely automatic. Models are available to cover a range from .003 oz to  $5\frac{1}{2}$  lb per fill.

Unit has been designed for use by inexperienced personnel and operation is simple. Filling speed is variable from 600 to 2000 fills per hour, depending on material and weight of fill. Machine is designed for continuous service, and there are no rotating parts requiring oiling or lubrication.



Filling machine won't damage product being dispensed

(Filling machine is a product of National Instrument Company, Dept. CP, 5005 Queensbury Ave., Baltimore 15, Md. . . or for more information check CP 6335 on the convenient Reader Service slip which is located opposite last page.)

**Permits use of paper labels on polyethylene containers**

Plastic adhesive has been developed that makes it possible to make ordinary paper labels adhere to polyethylene squeeze bottles and polyethylene containers. Adhesive, called Polygriptex, is easily applied by conventional labeling machines.

(Label adhesive is a product of Adhesive Products Corp., Dept. CP, 1660 Boone Ave., New York 60, N.Y. . . or for more information check CP 6336 on handy form opposite last page.)



*inside and outside*

## HACKNEY TWO-PIECE ACID DRUMS

**...are designed to protect your shipments of corrosive and poisonous chemicals**

**INSIDE**

- 1 Smoother interiors are exceptionally easy to clean—are free from cracks and crevices.
- 2 This extra-smooth butt weld joins the two entirely seamless halves of the drum.
- 3 Here is the seamless formed chime used on the 15-, 20- and 30-gallon sizes.
- 4 Here is the seamless, reinforced chime construction for the larger 55- and 110-gallon sizes.

**OUTSIDE**

- 5 Sturdy I-Bar rolling hoops—protect the seam and spud against hard knocks.
- 6 Heavy, forged spud is firmly welded—becomes an integral part of the drum itself.
- 7 Two-piece construction eliminates head and longitudinal seams (no crevice corrosion), increases strength and shock resistance.
- 8 Heavy, curled foot ring reinforces chime on the larger sizes—withstands transportation abuse.

Fully described in the new Hackney Drum and Barrel Catalog. Send for your copy today.

**Pressed Steel Tank Company**

Manufacturer  
of Hackney Products

1463 S. 66th St., Milwaukee 14 • 52 Vanderbilt Ave., Room 2087, New York 17 • 235 Hanna Bldg., Cleveland 15 • 936 W. Peachtree St., N.W., Room 126, Atlanta 3 • 208 S. LaSalle St., Room 796, Chicago 4 • 568 Roosevelt Bldg., Los Angeles 17 • 18 W. 43rd St., Room 19, Kansas City 11, Mo. • 144 Wallace Ave., Downingtown, Pa.

CONTAINERS FOR GASES, LIQUIDS, AND SOLIDS

When inquiring check CP 6337 opposite last page

# SLY PIONEERS and LEADERS in INDUSTRIAL DUST CONTROL

for all process operations

CRUSHING

MILLING

GRINDING

SCREENING

BLENDING

MIXING

DRYING

SEPARATION

FEEDING

CONVEYING

ELEVATING

WEIGHING

PACKAGING

**SLY**  
**FLAT BAG**  
**DUST**  
**FILTERS**

GET ALL OF  
THE DUST  
FROM THESE  
OPERATIONS

See the Dynalene, Chemical Show, Philadelphia, Booth 713.

SEND FOR BULLETIN 98

THE W.W.

**SLY**

MANUFACTURING CO.

4754 TRAIN AVENUE • CLEVELAND 2, OHIO  
New York • Chicago • Philadelphia • Syracuse • Detroit • Buffalo  
Cincinnati • St. Louis • Minneapolis • Birmingham • Los Angeles • Toronto

## PACKAGING

*Dries drums fast,  
inside and out . . .*

600 or more 55-gal drums  
handled in 8 hr

**Uses:** Drying interiors and exteriors of drums of any size after they have been washed and rinsed.

**Features:** Unit quickly dries complete surface of drum. As many as 600 drums (55-gal size) can be dried on an 8-drum station unit in an 8-hr period, with each drum having a 6-minute drying cycle. Since a 5-minute drying period should be ample in most cases, production speed can be increased.

**Description:** Drum dryer, Model DD-53, is available either gas or oil fired. It furnishes hot air up to 350°F. Higher temperatures are possible if special provision is made to cool blower bearings.

Machine is furnished with burner, controls, nozzles, piping, motor-driven blower, and foundation. Any number of drum stations can be specified.

(Drum dryer is a product of L. M. Gilbert Co., Dept. CP, 516 Drexel Bldg., Philadelphia 6, Pa. . . or for more information check CP 6339 on handy form opposite last page.)

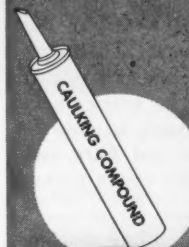
**Film bag construction  
omits bottom, center  
seams . . .**

variety of other bags made  
by versatile machine

Transparent and translucent film gusset bags without bottom or center seams are made on a machine called the Renka. Construction renders bags virtually sift-proof.

In addition to bags without bottom or center seam, machine makes eleven other transparent and translucent film bags: with tops reinforced by a plasticized string; flat with folded top; with rounded flaps; with both flaps and fold-over tops; paper-backed with reinforced top on film side;

*if your  
product*



tends to  
dry out



picks up  
moisture

is perishable



is greasy

**THERE'S AN RC FIBER CAN TO  
REDUCE YOUR COST**

(foil-lined, pitch-backed, paraffin-coated,  
laminated klee-wrap, many others).

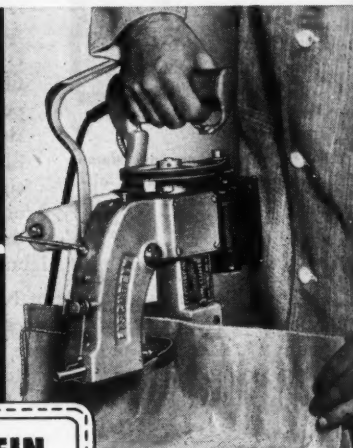
WRITE today for further information.

**R.C. CAN COMPANY**

ST. LOUIS 14, MO.

When inquiring check CP 6340 opposite last page

FOR  
**FAST,  
SECURE,  
LOW COST**  
**BAG CLOSING**



**FISCHBEIN**  
*Portable*  
**BAG CLOSER**

- A truly portable bag closer . . . Weighs only 10½ pounds.
- Requires no installation . . . plug into any outlet.
- Handles textile and paper bags.
- Simple to operate and maintain.
- Lowest priced bag closer on the market.

When inquiring check CP 6341 opposite last page

FOR DETAILS,  
MAIL THIS COUPON NOW  
**DAVE FISCHBEIN CO.**  
Dept. 98  
38 Glenwood Ave. N.  
Minneapolis, Minn.

Name.....

Firm Name.....

Address.....

City.....

State.....

• Efficient,  
penser elim  
leaky, stick  
pots. Nothin

7 COL  
Yellow, Wh

The pro  
method of s  
pails, crate  
materials,—

Ask u  
— bl  
permits

**REY**  
4516 B  
Tell u

Name .  
Compan  
Address

When i

APRIL,

When inquiring check CP 6338 opposite last page



ACCURACY

SIMPLICITY

SPEED



BARTELT — NEW

## Checkweigher

The Bartelt Checkweigher can save you money by assuring accurate weights without delaying production. It checkweighs containers at speeds up to 130 per minute, automatically rejecting off-weights to pre-selected weight differentials as accurate as plus or minus 1/60 of an ounce. Trouble-free performance, and low operating and maintenance costs are assured by the simplicity of construction. Let us send you all of the facts.

Write for folder today!

by **BARTELT**  
ENGINEERING COMPANY

ROCKFORD, ILLINOIS

When inquiring check CP 6342 opposite last page

Cut Stenciling Costs  
Eliminate Brushes and Ball Pots  
**Spray**  
Quick-Drying, Water-Proof  
**Stencil Ink**

• Efficient, easy-to-handle aerosol dispenser eliminates the mess and waste of leaky, sticky fountain brushes and ball pots. Nothing to clean. No waste.

7 COLORS—Black, Green, Red, Yellow, White, Orange and Blue.

The proven, widely used, modern method of stenciling boxes, cartons, drums, pails, crates—ideal for color coding of materials,—inspection marking, etc.

Ask us also about Stencil-Kover  
—blocks out old stenciling—  
permits containers to be used again



### REYNOLDS INK, Inc.

4516 EUCLID AVENUE, CLEVELAND 3, OHIO

Tell us more about your Stencil Ink and Stencil-Kover

☐ Send literature ☐ Ask your dealer to demonstrate

Name ..... Title .....

Company .....

Address .....

When inquiring check CP 6343 opposite last page

## PACKAGING

paper with transparent film window; and others. Bag sizes range from 2 to 22½" in length, from 3½ to 13" in width.

(Bag making machine is a product of Geveke & Co., Dept. CP, 25 Broadway, New York 4, N. Y. . . . or for more information check CP 6344 opposite last page.)

Plugs in anywhere,  
fills bags fast . . .

compact bag packer delivers  
1 cu ft in 5 to 10 sec

Uses: Filling valve or open-mouth bags and drums with practically any powdered or granulated material.

Features: Delivered as a complete package, bag packer merely has to be plugged in to electrical circuit to operate.

Description: Economical bag packer, called Econo-Speed Model 54, delivers 1 cu ft in 5 to 10 sec, depending on material handled.

(Bag packer is product of H. L. Stoker Company, Dept. CP, 111 South College Ave., Claremont, California. Check CP 6345 on handy form opposite last page.)

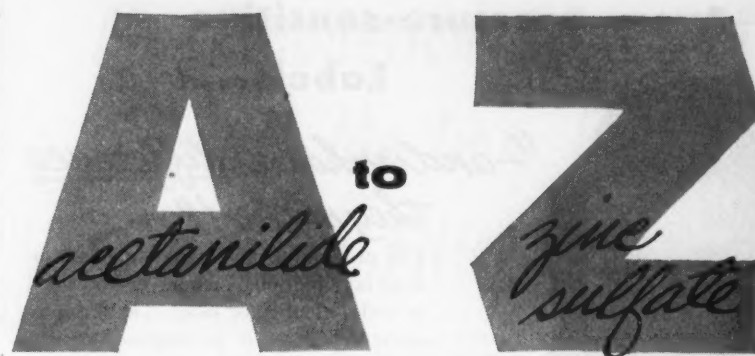
### The folding carton

Complete graphic review of the boxmaking industry and a detailed step-by-step treatise of the complete boxmaking operation is given in 56-page booklet. Starting with characteristics and function of the folding carton, booklet traces history and development of the industry, its economic status.

Continuing on with folding carton design, manufacture of paperboard, actual carton manufacture, it ends with a discussion of packaging machinery.

To obtain "The Folding Carton" remit \$1.25 direct to the Folding Paper Box Association of America, Dept. CP, 337 W. Madison St., Chicago 6, Ill.

from



## hard-to-pack chemicals

travel in

## Bemis Waterproof Bags



Any dry, powdered or granular product travels economically in a Bemis Bag.

But Bemis Waterproof (laminated-textile) Bags are your particular answer when you have a *hard-to-pack* product . . . one that requires special protection against moisture gain or loss, contamination, insect infestation, undesirable odors or loss of aroma.

If you need a little less than the super-protection of Bemis Waterproof Bags, your best bet is Bemis Flexibly Bags. These laminated, all-crinkled-paper bags are tough and shock-resistant . . . have stretch and flexibility . . . handle and stack easily.

Your Bemis Man will help you determine which is the practical, economical shipping bag for you. With either Bemis Waterproof or Bemis Flexibly, you get the benefits of Bemis crisp, multi-color printing . . . and Bemis multi-plant service.

Also in the Bemis  
family, serving the  
chemical industry . . .

Bemis Multiwall Paper Bags  
Bemis Burlap Bags  
Bemis Cotton Bags  
Bemis Special Thread

**Bemis**

408 Pine St., Box 92, St. Louis 2, Mo.

When inquiring check CP 6346 opposite last page

## Speed production labeling, save time and money with Avery pressure-sensitive Labels...

*"-and what a difference  
they make!"*

For production line work, or one-at-a-time labeling jobs—wherever you need to code, identify or label—in shipping or warehousing—in engineering, inspection or research—in maintenance or management... Avery Labels can save you time and money—can simplify and speed your work. That's why Avery pressure-sensitive Labeling is different... practical and economical! Avery's new dispensers—either manual or electric—are available to make your labeling even more efficient... to speed every type of labeling job—whether it's a single item or a thousand. Avery Labels are applied dry and fed, one or more at a time, ready for instant application. There's no sorting of loose labels... no messy glueing or licking... no soiled, spoiled packages.

### FAST, SIMPLE, AUTOMATIC LABELING WITH NEW AVERY '55 ELECTRIC DISPENSER.

Individually die-cut labels are automatically fed from rolls. As fast as one label is used, another pops out. Ask now for a demonstration... there's no obligation.

**KUM-KLEEN**  
when you want  
a REMOVABLE  
label.

**PERMA-GRIP**  
when you want  
a PERMANENT  
label.

Write now for details—  
Free sample labels and case histories!

**Kum-Kleen.**

**Perma-grip.**

**AVERY**  
PRESSURE-SENSITIVE  
**LABELS**

**AVERY ADHESIVE LABEL CORP., Custom Div. 123**  
1616 S. California Ave., Monrovia, Calif.  
117 Liberty Street, New York 6  
608 S. Dearborn Street, Chicago 5

name \_\_\_\_\_  
address \_\_\_\_\_  
city \_\_\_\_\_ state \_\_\_\_\_  
our business is \_\_\_\_\_

- ☐ Send me free samples and information on Avery Pressure-Sensitive Labels.
- ☐ I'd like to know more about the new "55" dispenser.
- ☐ Please have the Avery man call.

When inquiring check CP 6347 opposite last page

## PACKAGING

### Handy directory of polystyrene packaging suppliers

Custom and proprietary molders of polystyrene in the US and Canada who serve the packaging industry are listed in pocket-size directory. Alphabetical directory of various companies briefly describes their services.

"Packaging Suppliers Directory" is available from Koppers Company, Inc., Dept. CP, Koppers Building, Pittsburgh 19, Pa. When inquiring specify CP 6348 on handy form opposite last page.

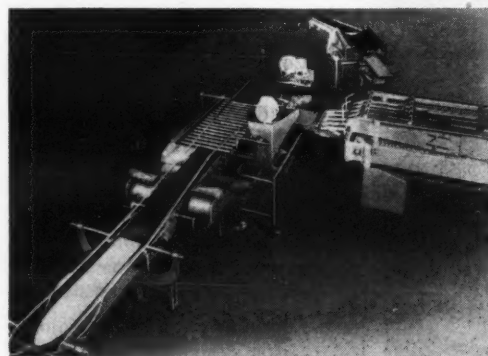
### Case-handling costs cut when operations are combined...

machine uncases empties, cases filled bottles, seals container in small floor space

**Uses:** Uncasing empty bottles, casing full bottles, and sealing cartons on both fast and moderate speed automatic bottling lines.

**Features:** Operations have been combined and simplified in this unit with consequent reduction in labor costs, case costs, floor space, and glass breakage. In this process cases and bottles while in cases are upright at all times. Tops of cases are sealed at glass plant, not bottoms as is conventional.

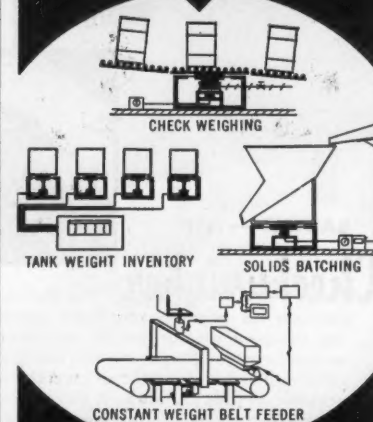
**Description:** In operation, cases of empty glass are conveyed to a bottom flap opener, which is activated when operator slides case to unscrambler and lifts case from bottles. While case is still in hand, operator turns and places case over a case



In machine, bottles and cases remain upright

load of filled bottles. These bottles, previously uncased, are filled, labeled, capped, etc, by regular automatic equipment, and returned to case beside operator, which groups bottles into case load patterns and releases bottles when case is placed over them.

## W/C Electric Weigh Scale



**...complete  
...self-contained  
NEEDS NO  
ENGINEERED INSTALLATION**

- Up to 10,000 lbs. gross capacity
- Guaranteed accuracy of entire system
- No effects from vibration
- No springs, levers, or knife edges
- Expert design of structures and circuits to fit individual requirements

Here's a system for batch or continuous process control that assures accurate net weights automatically, regardless of fluctuating tores. Electrical strain-gauge load cells of long-recognized accuracy are freed, through W/C pneumatic tare compensation, to respond only to net weights, thus using their effective range to measure only the variable controlling the process. Feeding belt conveyors, recording and controlling raw materials inventory, weighing finished packaged products to within 0.15% of gross—these typical applications of the W/C Weigh Scale should stimulate your imagination.

Find out how a W/C Electrical Scale can cut your process time and increase yield—inexpensively—by writing for Catalog 20.

**WEIGHING COMPONENTS, INC.**  
64-H Fulmer Ave. • Hatboro, Pa.

When inquiring check CP 6349  
opposite last page

CHEMICAL PROCESSING

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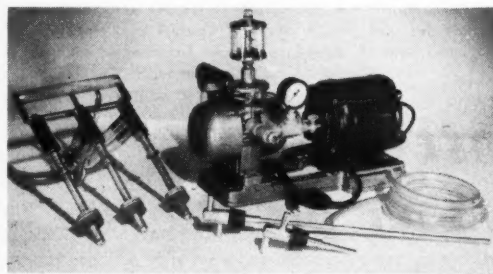
Inexpensive equipment then glues and closes bottom flaps as case gently rides along conveyors. Weight of filled containers acts as a compression unit to seal glue on case flaps. Operator can uncase and recase as fast as 13½ cases per minute.

(Case handling machines are products of Container Handling, Inc., Dept. CP, Box 2545 Terminal Annex, Los Angeles 54, Calif. Check CP 6350 on handy form opposite last page.)

**Mobile filling machine  
fits in for small lots  
or as auxiliary**

**Uses:** For filling small quantities of bottles with liquids, quickly and efficiently, unit is particularly useful in small bottling plants and as auxiliary equipment in large plants where sample lots of material make it impractical to use a larger filler.

**Features:** Unit is easily moved from place to place on ball bearing equipped roller casters. For stationary installations, casters can be removed and unit placed on floor or base.



Feature prevents cracked or defective bottles filling

Filling machine has continuous vacuum for instantaneous flow of liquid into bottles. Adjustable non-grip spouts are designed to fill liquid to any height. Fully automatic overflow is incorporated to return excess liquid to reservoir without loss of time or material.

Unit also gives filling loss protection to prevent cracked or defective bottles from filling, thus eliminating leakage or spoilage of package.

**Description:** Pump on machine, called Portable Vacuum Bottle Filler, is directly coupled to motor and eliminates slipping and stretching present on belt driven units. Equipment includes a three-spout adjustable filling handle, necessary tubing, and overflow valve. Any size bottle can be accommodated by simple manual adjustment. Bottle guides assist placing bottles in proper filling alignment.

(Bottle filling machine is a product of Ace Processing Equipment Co., Dept. CP, 632 E. 71st St., Chicago 19, Ill. Check CP 6351 opposite last page.)



# "VISKON® Filter Cloth Upped My Production 25% and Saved Me from Buying An Extra Filter Press!"

"I can clean 40 plates of VISKON filter cloth in 10 minutes of downtime. This permits me to maintain continuous line production and high standards of quality since time is important in pasteurizing honey. My previous downtime had been one hour after each filter cycle about every four hours. Beside this, diatomaceous earth will not go through VISKON—therefore, my filtrate is much clearer. . . . When it comes to filtering food under certain conditions, I just can't see how anyone could do a better job than with VISKON filter cloth."

—Raymond Fischer  
Fischer Apiaries  
North Little Rock, Arkansas

## IF YOU HAVE PLATE and FRAME FILTERS, CHECK VISKON for LOWER COSTS, GREATER EFFICIENCY

### Here's Why . . .

VISKON filter cloth is particularly well suited for plate and frame filtering. It steps up efficiency to such a degree that old equipment becomes highly productive.

VISKON filter cloth lasts longer because of the cellulose bond which protects each nonwoven fiber, yet permits a high degree of flow rate. VISKON has amazing wet strength.

VISKON filter cloth cleans quickly, easily. Frequently the filter cake falls off when plates are released to be cleaned. A low pressure hosing with water usually gets the job done.

VISKON filter cloths are available in cotton and synthetic fibers and in various blends in many weights and finishes. VISKON withstands normal filtering temperatures.

VISKON filter cloths are insoluble in common organic solvents and can be backwashed on line operations.

VISKON filter cloth saves you money! You save on downtime. You save on material cost even when you throw away VISKON filters. Yes, here is a new filter medium to save you money on materials and labor—yet gives you better operating efficiency!

**Use This Handy Coupon Or  
Dictate Your Inquiry Letter To:**

Mr. A. I. Pierce, Filter Media Engineer  
**THE VISKING CORPORATION**  
P. O. Box 72 • North Little Rock, Arkansas

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_  
Type of Filter Press \_\_\_\_\_

**VISKON**  
nonwoven fabrics

When inquiring check CP 6352 opposite last page



Edmont Case No. 517: Handling wood laminates and formed plastics, canvas gloves with rubber gloves as a liner lasted 3 to 5 shifts. Edmont Monkey Grip plastic coated gloves wore 30 to 40 shifts and were more comfortable.

## Job-fitted gloves wear 8 to 10 times longer .. add comfort



No. 151  
Plax plastic  
impregnated.



No. 30  
Monkey Grip  
plastic coated.

For handling all types of chemicals, abrasive, sharp, slippery or hot materials, modern Edmont job-fitted gloves far outlast old-type gloves, average 40% to 70% cost savings through longer wear. Have better flexibility and grip. Result in easier work handling, fewer accidents. Over 50 types, palm-coated, or fully-coated, to fit every job condition.

Edmont Case No. 419: Working in chemical solutions, job-fitted gloves coated with Neox (reinforced neoprene) outwore rubber coated gloves more than 4 to 1.

Edmont Case No. 356: In handling plastic laminates, leading manufacturer uses Edmont Plax (vinyl impregnated) gloves. Outwear canvas 4 times, protect against sharp edges, prevent finger marks on highly polished surfaces.

**FREE TEST OFFER:** Let us help you fit the correct gloves to your jobs. Send a description, on your letterhead, of your operation, materials handled and temperature condition. Without cost, we will recommend and forward samples of gloves for job-testing. Our laboratory also develops special gloves to meet special conditions.

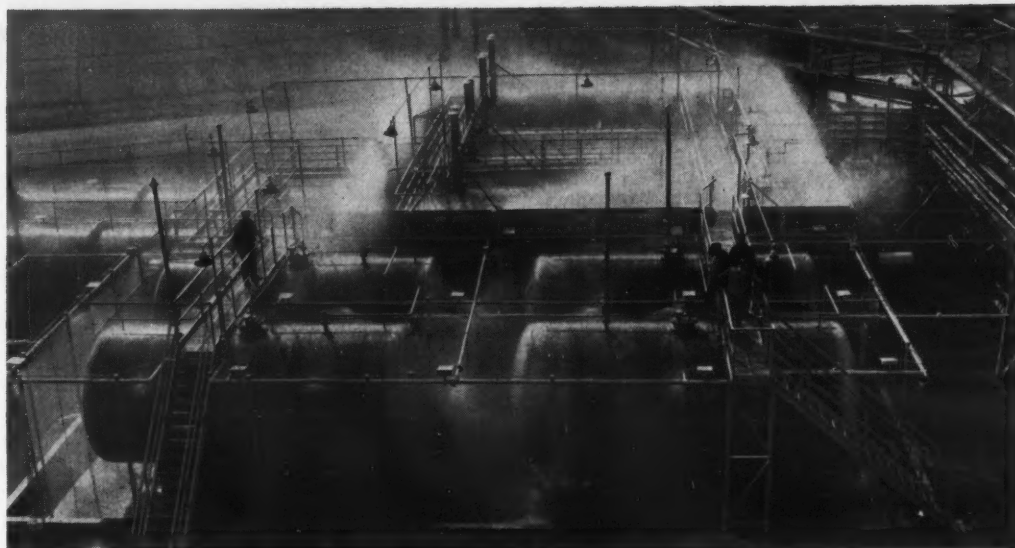
Edmont Manufacturing Co., 1204 Walnut St., Coshocton, Ohio  
World's largest maker of coated industrial gloves,  
available through leading industrial suppliers.



# Edmont job-fitted gloves

When inquiring check CP 6353 opposite last page

## safety



Wall of water consuming more than 3500 gallons a minute encloses styrene and butadiene tanks at Goodyear Tire & Rubber Company's Synthetic Rubber plant. System is set off by either a temperature rise caused by fire in tanks or by leaks in storage tanks

Automatic system replaces  
hand sampling of air to . . .

## guard against fire at synthetic rubber plant

J. L. SHIFFLETT, Fire Chief  
Goodyear Tire & Rubber Company  
Akron, Ohio

with RICHARD J. CALLAHAN, Assistant Editor

At Goodyear's Synthetic Rubber plant in Akron, large quantities of butadiene, styrene and acrylonitrile are used in process operations.

Up until a few years ago, the plant depended on gages and hand sampling of air to determine if dangerous leaks were present. This method, though carried out with the most scrupulous care, did not provide the measure of safety Goodyear felt was necessary.

A completely automatic system was designed and installed. This elaborate safety setup now includes the following features: automatic gas detecting devices, pressure relief valves, rupture discs, a full time fire department (33 men, 3 trucks) and an

Automatic Fire-Fog sprinkler system.

**Gas Detector** — In the butadiene storage area, a gas detector unit continuously samples the air. When butadiene concentration in air reaches 30% of lower explosive limit, alarms sound both at the storage area and in the plant fire station. If the concentration goes to 60% Fire-Fog system is set off.

**Rupture Discs** — Whenever rupture disc failures occur on flash tank, latex receiver or storage tanks signal is flashed to alarm panel in fire station, and location of the failure is pinpointed. A trouble horn also sounds.

**Fire-Fog System** — There are four separate Fire-Fog systems for the plant's tank farm area, namely:

- System 1) Butadiene storage
- System 2) Styrene and acrylonitrile storage
- System 3) Pump house and gasholder
- System 4) Process piping

These are set off by either a temperature rise in

the tanks vapor. T in a conc rene tank drainage drain wa site baffl atmospher

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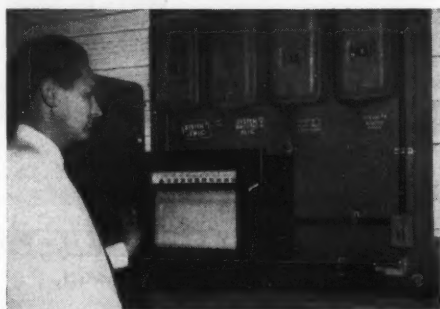
In additi can make the plant Rubber R supplied

**Plant Fir** ment com one assist and one shift arou cal equip pump tru general u This wel worth se action wh other oc rose.



the tanks, or by a leak which might emit volatile vapor. Tanks containing butadiene are enclosed in a concrete and fireproof composition vat. Styrene tanks are set in concrete reservoir to control drainage of chemicals in case of leakage and to drain water pouring from fire-fog nozzles. Transite baffles are also provided to direct vapors into atmosphere.

The Fire-Fog system is designed to deliver 0.3 gal of water per minute per square foot of exposed area as recommended by the National Board of Underwriters. When all four systems are in operation, water demand is 3125 gal per minute at 52 psi pressure.



Looking over recording instrument for detection of butadiene gas leakage is J. W. Kosko, head of the Chemigum plant of Goodyear Tire & Rubber Company in Akron, Ohio

There is no chance of water supply being inadequate. An underground 10" fire main supplied from the Cuyahoga River by means of three automatic 2500-gal-per-minute pumps, completely surrounds the plant. Constant pressure of 100 psi is maintained on this by a constant pressure pump in powerhouse. Flow test of available water at tank farm area shows there is supply of 4455 gal per min at flowing pressure of 71 psi.

In addition to its own water supply, Goodyear can make use of the city fire hydrants located at the plant as well as the water supply from its Rubber Reserve plant nearby. This latter system is supplied from a 650,000 gallon surface reservoir.

**Plant Fire Department** — Full time fire department consists of twenty-eight men, three captains, one assistant chief and one fire chief. Seven men and one captain are on duty on each eight-hour shift around the clock, seven days a week. Physical equipment is composed of one 5000-gpm fire pump truck, one 500-gpm trailer pump and one general utility truck.

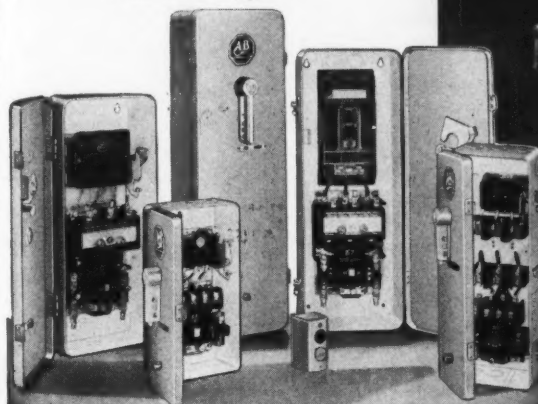
This well thought out safety setup has proved its worth several times. Fog system has gone into action when small leaks have occurred as well as on other occasions when temperature and pressure rose.

(Continued on next page)



## The Sign of QUALITY MOTOR CONTROL

Simple design—Quality workmanship—Maintenance free contacts—Long life.



Bulletin 712 starters use manual disconnect, either fused or unfused.  
Bulletin 713 starters use instantaneous trip circuit breakers.



### Motor Control Enclosures for Every

**Application**—Above is shown the many types of enclosures available for the plain Allen-Bradley starters. Most of these types can also be supplied for combination starters. All starters have double break, silver alloy contacts that need no cleaning, filing, or dressing . . . a maintenance free feature that is a decided advantage for starters with bolted enclosures.



## COMBINATION STARTERS make Neater and Safer Installations

If, in your plant, the Electrical Code requires a manual disconnect switch ahead of each magnetic starter . . . be smart . . . use Allen-Bradley Bulletin 712-713 combination starters. They are extra safe, because they cannot be opened unless the disconnect lever is in the OFF position. They save wiring expense, too, and make a compact, neat installation.

The above installation of Bulletin 712 combination starters in NEMA Type 4 waterproof enclosures, with watertight START-STOP buttons and pilot lights, is in a Peruvian salt refinery.

Bulletin 713 combination starters could have been used with a circuit breaker in place of the disconnect switch. The price is somewhat higher.

Allen-Bradley Co.,  
104 W. Greenfield Ave., Milwaukee 4, Wis.

In Canada—Allen-Bradley Canada Ltd., Galt, Ont.



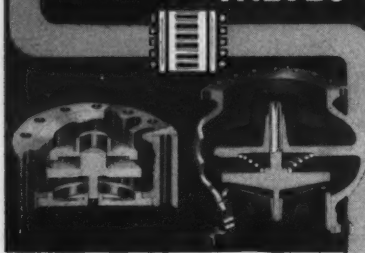
When inquiring check CP 6354 opposite last page

## For Positive Low Cost PROTECTION of your piping system

Silent Service Since 1929

WILLIAMS-HAGER  
FLANGED

*Silent*  
CHECK VALVES



for all piping systems  
handling water, acids, oils,  
gas, alkalies, other fluids.

Built to meet exacting service requirements—in sizes from 1" to 20"—Williams-Hager Check Valves will eliminate costly and dangerous water hammer in your piping system. Can be installed in horizontal, vertical or angular position. No special tools required. Send for Bulletin 654!

MAIL  
COUPON  
TODAY...



THE WILLIAMS GAUGE CO., INC.  
146 Stanwix St., 2 Gateway Center  
Pittsburgh 22, Pa.

Please send me a copy of Bulletin 654 on  
Williams-Hager Flanged Silent Check Valves.

NAME \_\_\_\_\_  
TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_  
ZONE \_\_\_\_\_

THE WILLIAMS GAUGE CO., INC.  
2 Gateway Center • Pittsburgh 22, Pa.

When inquiring check CP 6355  
opposite last page

## SAFETY

(Continued from preceding page)

To insure that everything is in perfect working order, the entire system is checked exhaustively every three months. The Fire-Fog system is checked for pressure and the lines cleaned out by running system at full capacity.

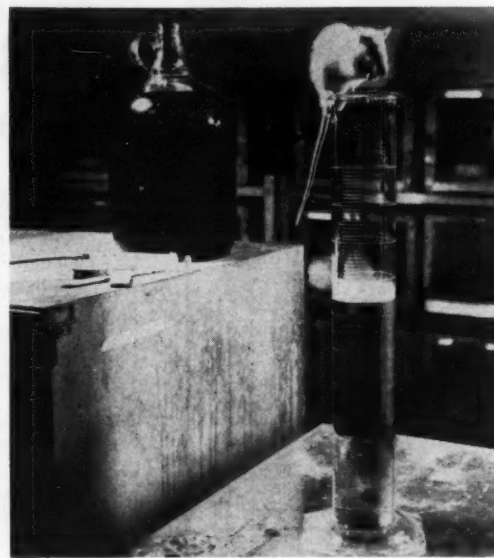
(Fire-Fog system was installed by Automatic Sprinkler Corporation of America, Brittain St., Youngstown, Ohio . . . or for more information check CP 6356 on handy form opposite back page.)

(Gas Detector was supplied by Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa. . . . or for more information check CP 6356A on handy form opposite last page.)

**Tamed iodine hard on germs —  
is non-staining, stingless  
and nontoxic . . .**

detergent-iodine disinfectant is non-selective in destroying bacteria and virus

Newly-developed "tamed" iodine presents the material in chemical union with two large organic molecules. About 15 to 20% of the iodine is bound



All 660 ml of "tamed" iodine could be downed by white rat in one dose (if it were physically possible) without ill effects. This corresponds to about 50 gal for an adult human

tightly while the rest is held loosely enough to be available for use in disinfecting. Concentration of available iodine in solution is about 1.6%.

Water-soluble disinfectant is non-staining, non-irritating, non-poisonous and non-selective in killing bacteria.

## BRIDGE THE "DANGER PERIOD" WITH HAW'S EYE-WASH FOUNTAINS



Even though summoned medical aid arrives as rapidly as possible, time elapsing between occurrence of eye accidents and a physician's care is too often the period when permanent harm is done.

Bridge this "danger period" with HAW'S Emergency Eye-Wash Fountains that permit injured workers instantaneously to wash injurious matter from their eyes with clear water at safe controlled pressure.



Available with HAW'S Drench Shower Attachment to form an "emergency first aid station" for your employees' protection. All HAW'S Safety Equipment is designed and manufactured in cooperation with leading safety engineers.



Write for full details today!

**HAW'S DRINKING FAUCET CO.**  
1439 FOURTH STREET (Since 1909) BERKELEY 10, CALIF.

When inquiring check CP 6357 opposite last page

## Comfortable Knit-lined PIONEER Stanzoil® INDUSTRIAL GLOVES

At home a dog offers its owner a daily example of real comfort. PIONEER's objective in designing Stanzoil Duplex Industrial Gloves is to give those who wear them the same kind of comfort at work. For

comfortable hands are busy hands, and protected hands are healthy hands.

Where comfort, maximum protection, tensile strength and abrasion, tear, aging, flame and heat resistance are important, and a safe non-slip grip necessary . . . where resistance to alcohols, acids, bases, oils, amines, greases or ketones is essential . . . where all these specifications form the basis for your buying decision, there's only one answer . . . PIONEER's Neoprene Stanzoil Duplex Gloves.

Pick the best, most economical glove for the job from 32 PIONEER styles (including neoprene, rubber and plastic gloves), weights, sizes, and colors shown in the "PIONEER Industrial Glove Catalog."



NL-34 Duplex is a lightweight elastic knit-lined glove of neoprene with straight fingers and non-slip grip. Small, medium and large sizes in 10 1/2" lengths.

the **PIONEER** Rubber Company  
241 Tiffin Road, Willard, Ohio, U. S. A.  
Quality Gloves for over 35 Years



When inquiring check CP 6358 opposite last page

CHEMICAL PROCESSING

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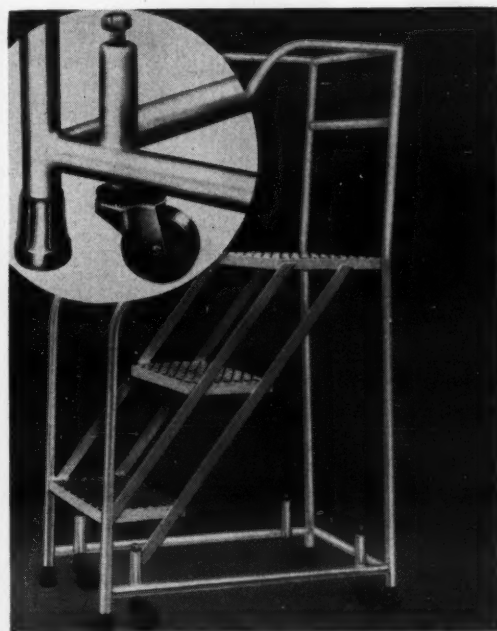
## SAFETY

Main applications for the material thus far are: *Wescodyne* — for sanitizer and cleaner in industrial and institutional use, *Iosan* — as detergent and germicide for dairy-use, *Iobac* — for sterilization of food and dairy processing equipment and *Showersan* — for combatting athlete's foot and related fungus infections.

(Disinfectants are products of West Disinfecting Co. Dept. CP, 42-16 West St., Long Island City 1, N. Y. . . . or for more information check CP 6359 on handy form opposite last page.)

### Ladders made safer by rubber grip which engages floor when user steps on ladder

Stability of ladder is substantially increased by use of rubber grip which engages floor when user steps on ladder. Caster carries weight of ladder for easy movability, but retracts automatically when ladder is used. Flared design of the rubber foot increases floor contact area.



Casters retract when ladders are in use

Ladders with the safety foot are available in 115 standard types, up to 12 steps, with choice of three safety treads (expanded steel lath, steel grip-strut, or rubber-clad steel plate.)

(Safety Ladders are manufactured by the Ballymore Co., Dept. CP, 139 Pennsylvania Ave., Wayne 10, Pa. . . . or for more information reader may simply check CP 6360 on the convenient Reader Service slip which is located opposite last page.)

# CROUSE-HINDS

Hazardous areas in this plant are lighted by Crouse-Hinds EV Series Explosion-Proof and Raintight Lighting Fixtures



Crouse-Hinds offers a complete line of explosion-proof and dust-tight lighting fixtures for use in hazardous locations where fluorescent lamps are desired.



## Explosion-Proof LIGHTING FIXTURES

... EXCEED the requirements for service in highly explosive atmospheres

To be safe for use in such locations, the fixture must operate at a temperature below the ignition temperature of the gas-air or vapor-air mixture. Also, the fixture must be so strong that it will resist internal explosions without damage and so tight that it will prevent the escape of flames or burning gases which might ignite the surrounding atmosphere.

Crouse-Hinds EV Series explosion-proof and raintight industrial lighting fixtures meet all of these requirements PLUS a wide margin of safety for extra protection.

Complete listings are in Crouse-Hinds Condulet Catalog.

### CROUSE-HINDS COMPANY Syracuse 1, N. Y.

OFFICES: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Indianapolis — Kansas City — Los Angeles — Milwaukee — Minneapolis — New Orleans — New York — Philadelphia — Pittsburgh — Portland, Ore. — San Francisco — Seattle — St. Louis — Tulsa — Washington  
RESIDENT REPRESENTATIVES: Albany — Atlanta — Baltimore — Charlotte — Corpus Christi — Richmond, Va. — Shreveport  
Crouse-Hinds Company of Canada, Ltd. Toronto, Ont.



CONDULETS • TRAFFIC SIGNALS • AIRPORT LIGHTING • FLOODLIGHTS

When inquiring check CP 6361 opposite last page

# CESCO

**RIGHT...**  
**before your Eyes!**

## FAMOUS ACITEX HOODS



No.  
732

• Acitex hoods thoroughly cover the head, chest and shoulders and allow no gaps for acid penetration. They provide the utmost protection from caustics, acids and splashing liquids. Acitex material is highly resistant to corrosive and harmful reaction of caustic soda, nitric, sulphuric, hydrochloric and hydrofluoric acids. Model shown is fresh air supplied for use in extremely hazardous fume conditions.

No. 748



## Snap-Fast Face Shield with Deflector Crown

• Here's a CESCO face shield that offers greater protection with more comfort. Tough, plastic windows, extending well beyond the ears, protect face and neck. Clear Vinyl windows are recommended where splashing acid is involved. Fiber deflector half crown protects fore part of head. Crown and window tilt as a unit.

## No. 99 Approved CESCO Respirator

• A twin cartridge organic vapor respirator (BM Approved) with positive acting inhale-exhale check valves which prevent rebreathing. Easy to install new cartridges. Converts to No. 96 (BM Approved) CESCO Dust Respirator by changing cartridges to filter pads. Buy one respirator with cartridges and filters for dual service.



CHICAGO EYE SHIELD COMPANY • 2316 Warren Boulevard, Chicago 12, Illinois



# CESCO FOR SAFETY

OFFICES IN: Atlanta, Birmingham, Boston, Buffalo, Cincinnati, Cleveland, Columbus, Dallas, Detroit, East Orange, Houston, Indianapolis, Kansas City, Knoxville, Little Rock, Los Angeles, Louisville, Mexico City D.F., Milwaukee, Montreal, Peoria, Philadelphia, Pittsburgh, Salt Lake City, San Francisco, Spokane, St. Louis, St. Paul, Toledo, Tulsa, Wichita

When inquiring check CP 6362 opposite last page

## SAFETY

**Use of rupture discs at Celanese  
provides certain protection  
from high or low pressure**

Rupture discs in use at the Customer Technical Service Laboratory of Celanese Corporation of America, Summit, N. J., provide sure protection from high or low pressures, according to the plant engineer.

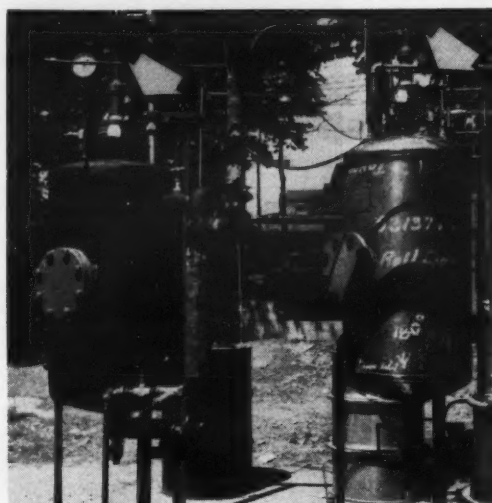


Fig 1—Low pressure rupture discs (arrows) in use at Celanese Corporation

Other methods for relief of pressure have been used in the past, but experience with the blowout discs has shown them to be less likely to malfunction in any way in this application. Rupture discs are used on both low and high pressure services.

Fig 1 shows 1/2" low pressure (less than 100 psi) rupture discs in use on product tanks in outdoor experimental area used for the development of various plastic materials. Discs used in this area are stainless steel or aluminum.



Fig 2—This 1000 psi rupture disc installation (arrow) on autoclave has functioned many times

times. Plant is well satisfied with the performance of the rupture discs. They are felt to be the best solution to relief of high pressures.

(Rupture discs are products of Black, Sivalls & Bryson, Inc., Dept. CP, 7500 E. 12th St., Kansas City 26, Mo. Check CP 6363 opposite last page.)

# DAVIS a complete line of GAS ANALYSIS SYSTEMS

operating by catalytic combustion, electro-conductivity, thermal conductivity, and photochemical reactions.

## Continuous ELECTRO- CONDUCTIVITY GAS ANALYZER

For the analysis of gases and vapors that ionize in water, directly or when decomposed by heat. Sensitive to small quantities.

Send for Bulletin 11-70

## Continuous COMBUSTIBLE GAS ALARM SYSTEMS

For the protection of life, property and processes against combustible gases and vapors in air. Gives audible and visual alarm signals.

Send for Bulletin 11-36

## PHOTOCHEMICAL OXYGEN ANALYZER

Continuous measurement of oxygen in gaseous streams, 0-100 p.p.m. Outstanding for simplicity of operation, specific measurement of oxygen without interference from most other gases.

Send for Bulletin 11-40



**DAVIS INSTRUMENTS**  
56 Hallock St., Newark 4, N. J.

Progressive Manufacturers of  
Gas Analysis Instruments

When inquiring check CP 6364  
opposite last page

CHEMICAL PROCESSING

Wears like i  
scraping, sna  
protection.  
100% Water  
quality base  
and then coat  
Latex.  
Positively  
peel. Its lo  
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Also: Three-c  
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APRIL,



## FOR COMPLETE PROTECTION AGAINST...



## Protective Clothing by *Sawyer*

**Wears like iron** — takes endless rubbing, scraping, snagging, and still gives full protection.

**100% Waterproof** — made with top quality base fabric saturation-coated first and then coated with 6 coats of Neoprene Latex.

**Positively** will not blister, crack or peel. Its longer lasting quality means greater economy.

**Also:** Three-quarter and long coats, aprons, coveralls and many other styles. All clothing made in black or yellow.



Cambridge, Massachusetts

When inquiring check CP 6365 opposite last page

## SAFETY

### Allows on-the-spot testing of flash points...

checks distillate fuel shipments in 2½ minutes or less

**Uses:** Rapid testing (2½ minutes) of flash points of distillate fuels.

**Features:** Fuel flashing at temperatures lower than setting of tester cannot be approved. No amount of manipulation by operator can pass unsafe sample; no more than one approval can be obtained at one time. Accuracy is within  $\pm 1^\circ\text{F}$ .

**Description:** Operated by either truck driver or loader, tester automatically performs "on-the-spot" flash tests at loading rack in 2½ minutes or less and stamps approval on a card with date and time.

Instrument correlates with ASTM D 56 but unlike tag closed cup flash tester does not require laboratory installation of skilled operator.

(Flash point tester is a product of the Precision Scientific Co., Dept. CP, 3737 W. Cortland St., Chicago 47, Ill. . . . or for more information check CP 6366 on handy form opposite last page.)

### Prevents tampering with extinguishers by keeping them inaccessible except in emergencies...

locked case discourages improper use but keeps extinguisher ready for instant use

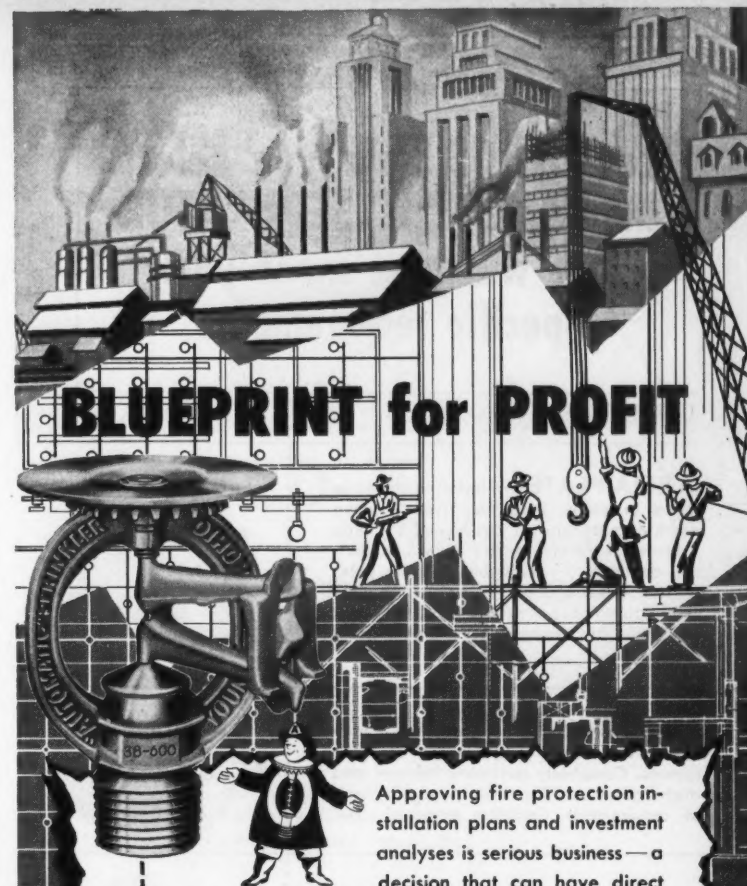
**Uses:** To prevent tampering or disturbance of fire extinguishers.

**Features:** Although boxes are padlocked, any extinguisher is quickly available to anyone, merely by striking breaker-arm on door. Broken seal drops into receptacle and is easily discarded.

**Description:** Metal safety box provides good protection against fire extinguishers being improperly stationed, empty, dented or corroded.

Boxes are made to fit all extinguishers and are painted red for visibility. Glass panels on side of box allow easy inspection of extinguisher. Construction is of 20 gage steel.

(Tam-Pruf Safety Boxes are a product of Erie Safety Products Co., Dept. CP, 1250 W. 65th St., Cleveland 2, Ohio. Check CP 6366A opposite last page.)



Approving fire protection installation plans and investment analyses is serious business—a decision that can have direct

bearing on the profit margin of a business.

That's why "Automatic" Sprinkler works closely with its customers and their architects, engineers and insurance counsellors on the development of a fire safety program, custom-engineered to specific needs.

A standard "Automatic" Sprinkler system may be required, or conditions may dictate design of an entirely new method of fire control and extinguishment for unusual or severe hazards. In any event, "Automatic" Sprinkler protection represents the last word in engineering technique . . . the finest of manufactured components, and the highest standards of installation craftsmanship.

*"Automatic"*  
*Sprinkler*

CORPORATION OF AMERICA  
YOUNGSTOWN, OHIO

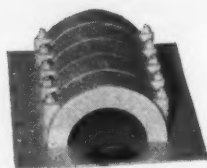
Better BLUEPRINT your  
PROFITS of tomorrow,  
by investigating  
ENGINEERED  
Automatic Sprinkler  
PROTECTION—today!

Offices in Principal Cities of North and South America

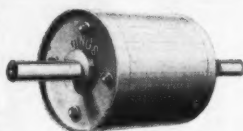
When inquiring check CP 6367 opposite last page

## Let DINGS help you select the MAGNETIC SEPARATOR that will best meet your specific requirements

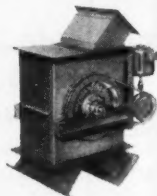
**PERMA-PLATES** — Install in chutes or spouts or above belts. Use Type 1 when depth of material does not exceed 1"; Type 2 for burden depths to 2"; Type 3 for burden depths to 3". Available with two poles for standard service and four poles for maximum protection on difficult jobs. All sizes. The lowest cost answer to tramp iron removal problems!



**PERMA-PULLEYS** — Install as a non-electric head drive pulley in belt conveyor systems. Completely automatic removal and discharge of iron. Extremely powerful. Meets all requirements. Complete range of sizes.



**PERMA-DRUMS** — Install bare drums at the discharge of spouts or chutes; fully enclosed models can be installed in closed chutes for completely dust tight installations. Highest grade Alnico. More powerful than old electro-drums. Fully automatic removal and discharge of iron.



● At Dings, "job-selecting" a magnet can be done on an ideal basis because Dings, and only Dings, offers these three things: (1) the widest line of types and sizes available; (2) unsurpassed quality of materials and magnetic engineering; (3) OVER 50 YEARS' EXPERIENCE IN THE DESIGN, MANUFACTURE AND APPLICATION OF EVERY CONCEIVABLE TYPE OF MAGNETIC SEPARATOR. Whatever your magnetic separation problem, these are the advantages you get when you buy a Dings "Job-Selected" magnet.

**DINGS MAGNETIC  
SEPARATOR CO.**  
4731 W. ELECTRIC AVE.  
MILWAUKEE 46, WIS.

# Dings

MAIL  
THIS  
COUPON  
TODAY

**DINGS MAGNETIC SEPARATOR CO.**

4731 W. Electric Ave.  
Milwaukee 46, Wis.

Please send copy of Catalog C-5000-B.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check CP 6368 opposite last page

## SAFETY

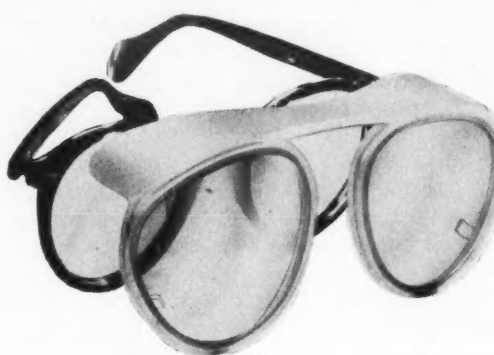
**Regular glasses protected  
by polyethylene goggles  
which snap on . . .**

clip allows wearer to put on or take off safety glasses quickly

**Uses:** To prevent breakage or pitting of prescription lenses.

**Features:** Lenses are available in light or medium green and can be changed without tools. Frames are either translucent white or green.

**Description:** Lightweight polyethylene glasses clip over prescription lenses. Over-eyes protection



Polyethylene lenses protect prescription glasses

is provided by visor which extends back to forehead to block out particles, dust, perspiration and glare. Shatterproof lenses are 0.080" thick and are optically perfect to prevent eyestrain due to distortion.

(Tuc-Over glasses are a product of the Watchemoket Optical Co., Dept. CP, 232 W. Exchange St., Providence 3, R.I. . . or for more information check CP 6369 on handy form opposite last page.)

## Properties and performance data given on fire-resistant hydraulic fluid

Detailed information on properties, its past performance in various applications, and instructions for converting a system for its use is provided by 20-page booklet on fire-resistant hydraulic fluid.

A straight synthetic, fluid has excellent lubricity, high stability and is non-corrosive. Booklet tells how simple recovery and filter system can be used to reclaim fluid.

Pydraul F-9 Booklet is issued by Monsanto Chemical Co., Organic Chemicals Div., Dept. CP, 800 N. 12th St., St. Louis 1, Missouri. When inquiring specify CP 6370 on handy form opposite last page.

## Safety Fights Corrosion with

**PROTECTOSEAL  
APPROVED**

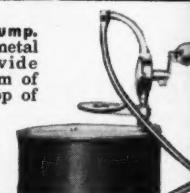
## FIRE PREVENTIVE EQUIPMENT

**Space-saving Stainless Steel Shelf Can.** Oval shape permits maximum number of containers in minimum space; when grasped by handle is in correct position for pouring. Seam-welded construction; double-wall fire baffle in spout; self-closing cap with ball and socket seals liquid vapors and provides pressure relief. Also supplied in terne plate. 1-gallon capacity.



**Stainless Steel Wide-Mouth Disposal Can.** Large 3 3/4" opening may be locked in open position; seam-welded body with perforated metal fire baffle. Leak-proof spring-loaded cap prevents evaporation and provides pressure relief. Also available in terne plate. Sizes: 2-gals. and 5-gals.

**Safety Transfer Pump.** Three perforated metal fire baffles provide safety from bottom of suction tube to top of discharge nozzle. Static-proof hose. Steady even flow; fast shutoff.



**Safety Storage Cabinet** permits storage of 45-gallons of hazardous liquids in any department in approved fire preventive containers of not more than 5 gallons. Complies with specifications of NFPA.

Protectoseal designs and builds All Types of Approved Fire Preventive Equipment for the Storage, Transfer and Plant use of all Flammable Liquids.

Check coupon and attach to company letterhead. In Canada, Safety Supply Co., Canada

**The Protectoseal Company**  
1932 So. Western Avenue, Chicago 8, Illinois  
Send without obligation the descriptive literature checked.

☐ Laboratory Safety Equipment Catalog Sheet

☐ Hazardous Liquid Equipment Chart and Price List of more than 30 Approved Fire Protective Devices

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check CP 6371 opposite last page

CHEMICAL PROCESSING



# Now! for greater safety

## New Safety GRIP-STRUT stair treads custom made to your exact

size . . . Here for the first time is a really SAFE stair or ladder step, combining the proven features of Safety GRIP-STRUT material with a double locked carrier plate to provide additional safety over present types.



Made to your own individual size at the factory, the cost is amazingly low . . . you can buy a standard 18" stair tread in lots of 50 for \$2.40 each. Prices proportionately lower in greater quantities.

Distributors in all principal cities. Consult your classified telephone directory.

## GRIP-STRUT division

The Globe Company

Manufacturers since 1914

4006 S. Princeton Ave. • Chicago 9, Illinois

When inquiring check CP 6372 opposite last page

## PRICES REDUCED to an all-time low!

## WORKLON® ACID & CHEMICAL RESISTANT INDUSTRIAL APPAREL



Du Pont • ORLON OR Union Carbide DYNEL

- ★ ACID, CHEMICAL AND ABRASION RESISTANT!
- ★ U.S. NAVY SAYS: OUTWEARS COTTON 50 TO 1
- ★ LAUNDERS AND DRIES QUICKLY — NO IRONING!

Save up to

**93%**

**NOW  
READY!  
New, free  
CATALOG**

\*Du Pont Orlon acrylic fiber

WORKLON, INC. Dept. CP-4 253 West 28th St., New York 1  
FREE! Rush WORKLON's new, fully illustrated catalog of  
ORLON, DYNEL WORK CLOTHES.

Firm Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
Attention of \_\_\_\_\_ Dept. \_\_\_\_\_

When inquiring check CP 6373 opposite last page

## SAFETY

### Fire protection manual for natural gas plants

A new fire protection manual for natural gasoline plants has been published by The American Petroleum Institute.

Manual contains recommendations for fire protection equipment and an employee training program for use in all types and sizes of natural gasoline and cycling plants. Although manual was prepared primarily for natural gasoline and cycling plants, it also will have broad application in gas compression stations.

Manual was written under the auspices of the Committee on Natural Gasoline of the Institute's Central Committee on Fire Protection and Accident Prevention.

Fire Protection Manual is available by remitting 50c direct to American Petroleum Institute, Dept. CP, 50 W. 50th St., New York 20, N. Y.

### Non-flammable vehicle indicates temperature of heated objects

Materials of calibrated melting points are suspended in inert, volatile, non-flammable vehicle for determining temperatures of heated objects. Upon application, material dries quickly, leaving mat opaque coating which liquefies when specified temperature is reached.

Tempilaq adheres to glass and other polished surfaces and can be used in checking temperatures of power tubes, wire, plastic parts, and other such products. Material is available in range from 113 to 400°F in 12½° intervals, in range 400 to 550°F in 25 steps, and in 50°F intervals from 550 to 2000°F.

(Tempilaq is a product of Tempil Corp., Dept. CP, 132 W. 22nd St., New York 11, N. Y. . . . or for more information check CP 6374 opposite last page.)

## Scott Air-Paks Cut Repair and Maintenance Costs, Safely!



## SAVED from Complete Plant Evacuation and Production Shut-Down

- This manufacturer of a chemical product had too many costly experiences resulting from leaks of ammonia and chlorine. It meant complete evacuation of personnel, opening windows to lower gas concentrations and prolonged attempts to fix the leaks by workers wearing inadequate cannister masks. Repair work was painfully slow because repairmen had to make frequent trips to windows for fresh air. It was a costly procedure.

Now — equipped with Scott Air-Paks, repairmen are able to make quick repairs with complete breathing safety. Evacuation of personnel is unnecessary. Result: no lost time — no production losses. The Scott Air-Paks have paid for themselves many times over!

Do you have a similar problem? Then write for the free booklet "Scott Air-Paks Save Money, Man Hours and Men for Industry."

On  
Hazardous Jobs  
Scott Air-Paks  
Help Management  
and Labor  
Breathe Easier



242 ERIE STREET

LANCASTER, N. Y.

Canada: Safety Supply Co., Toronto — Branches in principal cities  
Export: Southern Oxygen Co., 15 West 57th Street, New York 19, N. Y.

When inquiring check CP 6375 opposite last page

**completely  
non-sparking  
-easy  
to handle**

**aluminum  
ladder**

by

**ALCO-LITE**

**weighs  
slightly more  
than 1 lb.  
per foot!**

lengths — 16' to 24'  
weights — 19 lbs. to 27 lbs.

**RUNGS WON'T TWIST,  
TURN OR BREAK OFF.**

Corrugated 1" tubular aluminum rungs are permanently attached to the side rails with exclusive ALCO-LITE gusset plate and expansion bushing construction.

### Won't rust, rot, burn, or splinter!

The DLL Extension Ladder is the lightest — easiest to use ALCO-LITE extension ladder made. Because it is non-sparking it is completely safe around inflammable material. It easily supports a 500 lb. load and more than meets the rigid code and tests of the ASA and Metal Ladders Association. Lasts for years with almost no maintenance. WRITE FOR DETAILS!

ALUMINUM LADDER COMPANY  
Dept. A1  
Worthington, Pa.

Please send me further details about the DLL Extension and other ALCO-LITE Aluminum Ladders.

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

When inquiring check CP 6376  
opposite last page

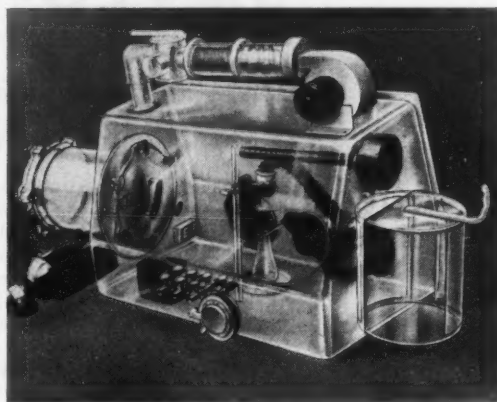
## SAFETY

### Plastic control hood is standard unit

**Uses:** For processes requiring controlled conditions during product assembly or laboratory research. Offers complete protection from radioactive isotopes and dusts of alpha and beta energies and gamma rays of low energy.

**Features:** Light weight of unit (less than 20 lb) permits change of location easily.

**Description:** Hood is constructed of crystal-clear plastic material which is chemically inert and has complete stability at 450°F. It permits completely isolated work area preventing con-



Control hood weighs only 20 lb

tamination of work material by airborne bacteria, fungi, or molds as well as protecting workers from hazardous materials. It permits use of air filtration, dehumidification, high temperatures, and air-lock conditions.

Humidistat sensitive to change of relative humidity as low as 2% has been incorporated into unit.

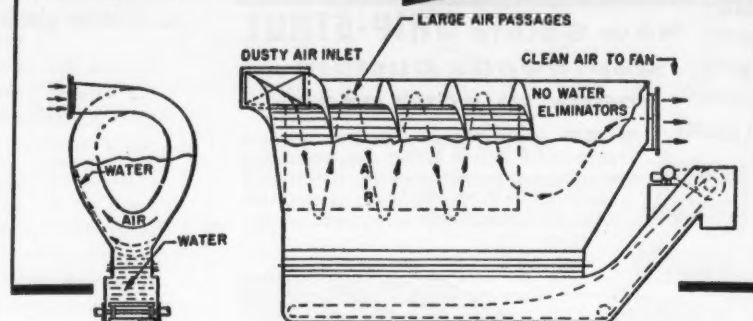
(Control hood is product of P. M. Lennard Co., Inc., Dept. CP, 671 Bergen St., Brooklyn 38, N. Y. . . . or for more information check CP 6377 on handy form opposite last page.)

### General catalog shows industrial safety equipment

General catalog of industrial safety equipment is divided into four main sections — eye protection, head protection, respiratory protection, and welding. Illustrations, descriptions, and ordering information are included.

Catalog "Industrial Safety Equipment" is available from Willson Products, Inc., Dept. CP, Reading, Pa. When inquiring reader may simply specify CP 6378 on the convenient Reader Service slip opposite last page.

## THIS IS THE . . . Air Tumbler



**the master of DUST in industry \* \* \***

**SIMPLE—DEPENDABLE  
NO FIRE HAZARD  
HIGH EFFICIENCY  
CONSTANT CAPACITY  
LOW OPERATING COST**

Write for Bulletin No. 531. Address:

**DUST SUPPRESSION & ENGINEERING COMPANY**

P. O. BOX 67, LAKE ORION, MICHIGAN

Agents in all principal U. S. cities

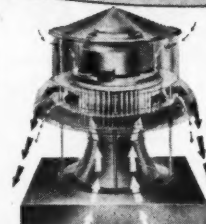
When inquiring check CP 6379 opposite last page



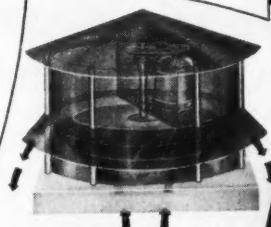
In addition to having the motor out of the airstream, fresh clean air is constantly drawn through the motor hood creating an air curtain around the motor shaft which absolutely prevents fumes from entering the housing while the unit is in operation.\* This eliminates most special winding motors.

Where high slot speeds must be maintained Gallaher Air-Vans with patented scroll effect design are generally the answer. Design research has shown that without this feature efficiency against even 1/4" S.P. is impossible. Gallaher units develop up to 4" static pressure and 65,000 CFM. Ratings have been certified in an independent laboratory under the direction of a nationally recognized authority.

Other features include low silhouette, weatherproof design, low noise levels, and availability in special metal and finishes, shipped as a complete package ready for installation. \*patented exclusive features.



Gallaher Air-Van Direct Drive  
150-11,000 CFM S. P. to 4.2"



Gallaher Belt Drive 5,000-  
65,000 CFM S. P. to 4"

**The GALLAHER Company**

4108 Dodge Street

Omaha 3, Nebraska

When inquiring check CP 6380 opposite last page

CHEMICAL PROCESSING



Important Data  
on  
**EXPLOSION RESISTANT  
SNUBBERS**  
by **BURGESS-MANNING**



Here is the answer to your surge and noise problems created by engines, compressors, and vacuum systems. Burgess-Manning "BE" Snubbers are engineered to your specific need — designed to reduce that annoying exhaust roar to a smooth, quiet, and harmless discharge—and ruggedly built and internally reinforced to resist explosive pressures.

Profit through better neighbor and employee relations — avoid compensation claims.

Write for complete information  
giving full specifications  
of your requirement.



**BURGESS-MANNING COMPANY**

Sound Engineering 721 East Park Avenue, Libertyville, Illinois  
Dallas Chicago

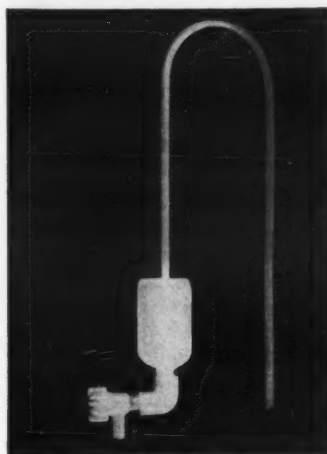
When inquiring check CP 6381 opposite last page

APRIL, 1955

**SAFETY**

**Cuts tipping hazards  
with plastic siphon**

Polyethylene siphon empties carboys and drums without danger involved in tipping. To operate, bulk is squeezed a few times and spigot is opened to draw off liquid.



All polyethylene siphon

Siphon is in primed condition as long as it is in place. Enough tubing is furnished to use with drums or carboys.

(Poly-Syphon is a product of The Nalge Co., Dept. CP, 625 S. Goodman St., Rochester 20, N. Y. . . or for more information check CP 6382 on handy form opposite last page.)

**Shows many ways  
to save eyes**

Illustrated seven-page catalog describes developments in eye protection equipment. Impact-resistant lenses, anti-fog goggles, snap-on glasses, face shields, welding goggles and colored lenses are described in booklet.

"Eye Savers" is issued by the Watchemoket Optical Co., Dept. CP, 232 W. Exchange St., Providence 3, R. I. When inquiring specify CP 6383 on handy form which is located opposite last page.

# IT FIGURES

You want  
long-lasting  
filter cloths  
with  
built-in  
resistance  
to chemicals  
and mildew



## GET 'EM FOR LESS WITH DYNEL

Tests in plant after plant prove that DYNEL filter cloths and matting last four or five times longer than traditional cloths . . . are unaffected by most chemicals, keep their size and shape, retain their high strength wet or dry, are mildewproof, won't support combustion.

**YES, IT FIGURES.** These qualities are built into DYNEL fiber to give you dependable, efficient performance. It saves you time, reduces your labor costs, cuts your operating expenses. See for yourself. Run samples of DYNEL filter fabrics or mats under the specific conditions in your plant. Write for list of manufacturers.

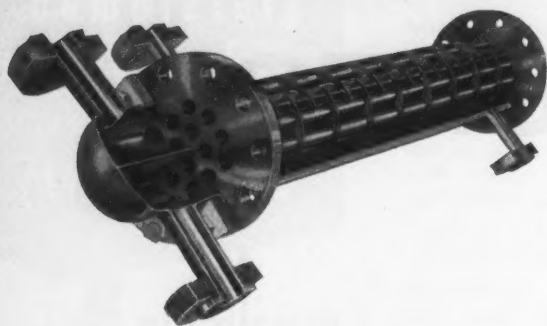
The fiber that figures in your future

# DYNEL

Textile Fibers Department, Carbide and Carbon Chemicals Company  
A Division of Union Carbide and Carbon Corporation 30 E. 42nd St., New York 17, N. Y.

When inquiring check CP 6384 opposite last page

## HEAT EXCHANGERS . . .



### "Off-the-shelf" delivery in less than two weeks!

In 14 days or less, any of these six sizes of Pfaudler stainless steel heat exchangers can be speeding on its way to your plant!

Pfaudler's new stocking program, plus standard design, make "off-the-shelf" delivery possible. These units are ready for almost immediate shipment and are all fixed tube sheet design. Shell and baffles are made of carbon steel; tubes, tube sheets and bonnets, stainless steel.

#### DIMENSIONS AND PRICES (on all prices, add \$40 if code stamp is required).

**56 sq. ft. size**—8" nominal shell diameter; 72" tube length; baffles on 4" centers; Type 316 tubes; single pass.

Price . . . \$1199 f.o.b. Elyria, Ohio

**101 sq. ft. size**—10" nominal shell diameter; 96" tube length; baffles on 5" centers; Type 316 tubes; six pass.

Price . . . \$1758 f.o.b. Elyria, Ohio

**104 sq. ft. size**—10" nominal shell diameter; 84" tube length; baffles on 5" centers; Type 316 or 304 tubes; single pass.

Price . . . Type 316 . . . \$1648 f.o.b. Elyria, Ohio

Type 304 . . . \$1437 f.o.b. Elyria, Ohio

**149 sq. ft. size**—10" nominal shell diameter; 120" tube length; baffles on 5" centers; Type 316 tubes; single pass.

Price . . . \$1943 f.o.b. Elyria, Ohio

**216 sq. ft. size**—12" nominal shell diameter; 120" tube length; baffles on 6" centers; Type 316 tubes; single pass.

Price . . . \$2622 f.o.b. Elyria, Ohio

**316 sq. ft. size**—14" nominal shell diameter; 144" tube length; baffles on 7" centers; Type 316 tubes; single pass.

Price . . . \$3704 f.o.b. Elyria, Ohio

Also available for fast delivery, are a wide variety of other sizes: 4 weeks delivery on all standard single pass units up through 10" diameter. 6 weeks delivery on all standard multipass units up through 10" diameter. 6-8 weeks delivery on all standard units 12" in diameter and above.

For a fast, effective answer to that heat exchanger problem, call your nearest Pfaudler office or mail the coupon.

# Pfaudler



THE PFAUDLER CO., Dept. CP-4 Rochester 3, N. Y.

- ☐ Send me your heat exchanger catalog.  
☐ Send a salesman! I need heat exchanger help!

Name \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

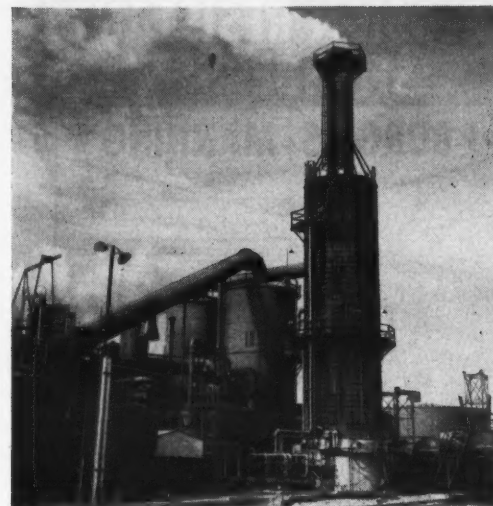
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check CP 6385 opposite last page

## processing equipment

**SO<sub>2</sub> recovery raises acid  
production 20% cleans up  
absorber exit gases so Olin  
Mathieson's Pasadena plant  
can say —**

## goodbye to air pollution



Redwood tower at right absorbs sulfur dioxide gases coming from acid plant at left

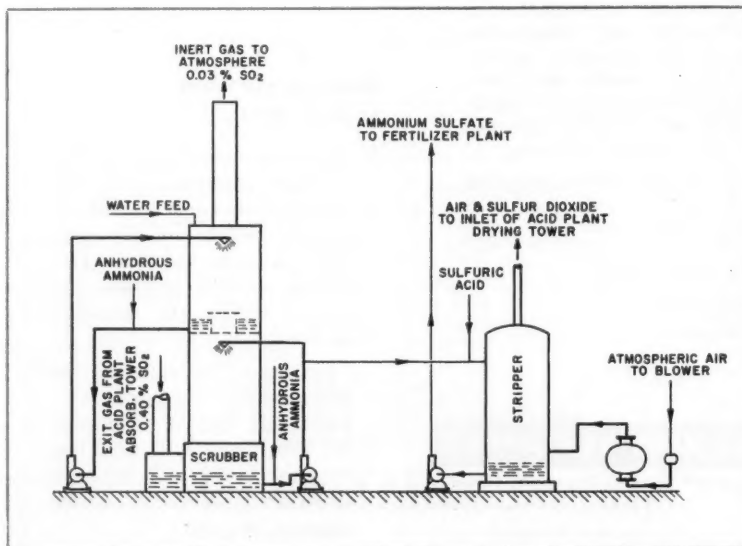
**W. W. LEHLE**, General Manager  
Western Sulfur and Acid Division  
Olin Mathieson Chemical Corporation  
Little Rock, Arkansas

with **GORDON WEYERMULLER**, Associate Editor

A highly favorable community reaction has resulted from the SO<sub>2</sub> recovery process being used in conjunction with a 400-ton-per-day sulfuric acid plant at Olin Mathieson Chemical Corporation in Pasadena, Texas. Process reduces gases going to atmos-

phere from 0.4% SO<sub>2</sub> to 0.03% or less, virtually eliminating pollution of the air. An added bonus is a 20% increase in acid production provided by the recovery unit.

The modified Cominco sulfur dioxide process was placed in operation in September 1953. System consists of a Santa Fe redwood absorption tower and a stripper for recovering SO<sub>2</sub> from the ammonium-bisulfite absorbing system. Although major portion of gases are recovered in the form of SO<sub>2</sub>, which passes to acid plant for conversion to sulfuric acid, some ammonium sulfate is also formed.



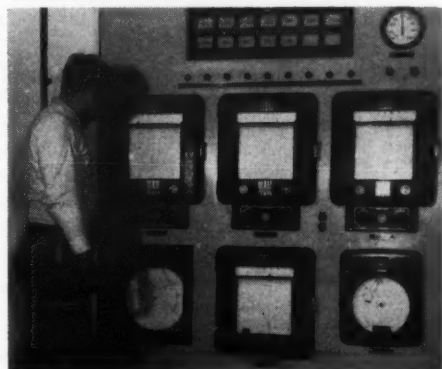
Exit gas  
0.4% S  
These  
flow di  
peratur  
separat  
two-sta  
bisulfite  
top and  
removal  
The ph  
trolled  
ing am  
added  
to amm  
keeps  
in both  
top of

ber is t  
Fresh  
the eve  
from t  
drying  
tion fr  
sulfate  
tion. T  
exit co  
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panelb  
control  
require  
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dioxide  
point  
objectiv  
(Modi  
in the  
Corp.,  
or che



Exit gases from plant absorption towers, containing 0.4%  $\text{SO}_2$ , formerly went out into the atmosphere. These gases now enter the base of scrubber (see flow diagram) at a rate of 25,000 cfm and a temperature of 175°F. Upper section of the tower is separated from lower section to form, in effect, a two-stage unit. About 900 gpm of ammonium bisulfite absorbing solution is circulated in both the top and the bottom tower, solution in top insuring removal of all but traces of sulfur dioxide.

The pH of absorbing solution is automatically controlled by the addition of the ammonia, minimizing ammonium sulfate formation. The ammonia added serves as make-up for that which is converted to ammonium sulfate. Water added to top section keeps solution specific gravity at optimum value in both sections. Inert gases are exhausted from top of tower. Solution from bottom section of scrub-



Control board for  $\text{SO}_2$  recovery unit

ber is taken off as side stream sent to stripper.

Fresh acid is added to the stripper to assist in the evolution of the sulfur dioxide gas. Exit gases from the stripper are returned to the acid plant drying tower for conversion to sulfuric acid. Solution from stripper, containing 40-45% ammonium sulfate, is pumped to an adjacent fertilizer installation. Tail gases from scrubbing system at stack exit contain a maximum of 0.03% sulfur dioxide.

No additional operators, besides those used in acid plant, are required for recovery unit. Instrument panelboard was placed in same room as acid plant controls. Only a minimum of maintenance has been required for recovery unit since operation.

Recovery unit cost \$340,000. If the increased sulfuric acid capacity can be utilized, the cost of the plant is more economical than buying new acid plant facilities for forming and purifying sulfur dioxide. This makes process attractive from this point of view, in addition to accomplishing the objective of eliminating atmospheric pollution.

(Modified Cominco  $\text{SO}_2$  recovery process is licensed in the United States by Olin Mathieson Chemical Corp., Dept. CP, Box 991, Little Rock, Ark. . . . or check CP 6386 opposite last page.)

## Louisville Method

how **BIG** should a dryer be?

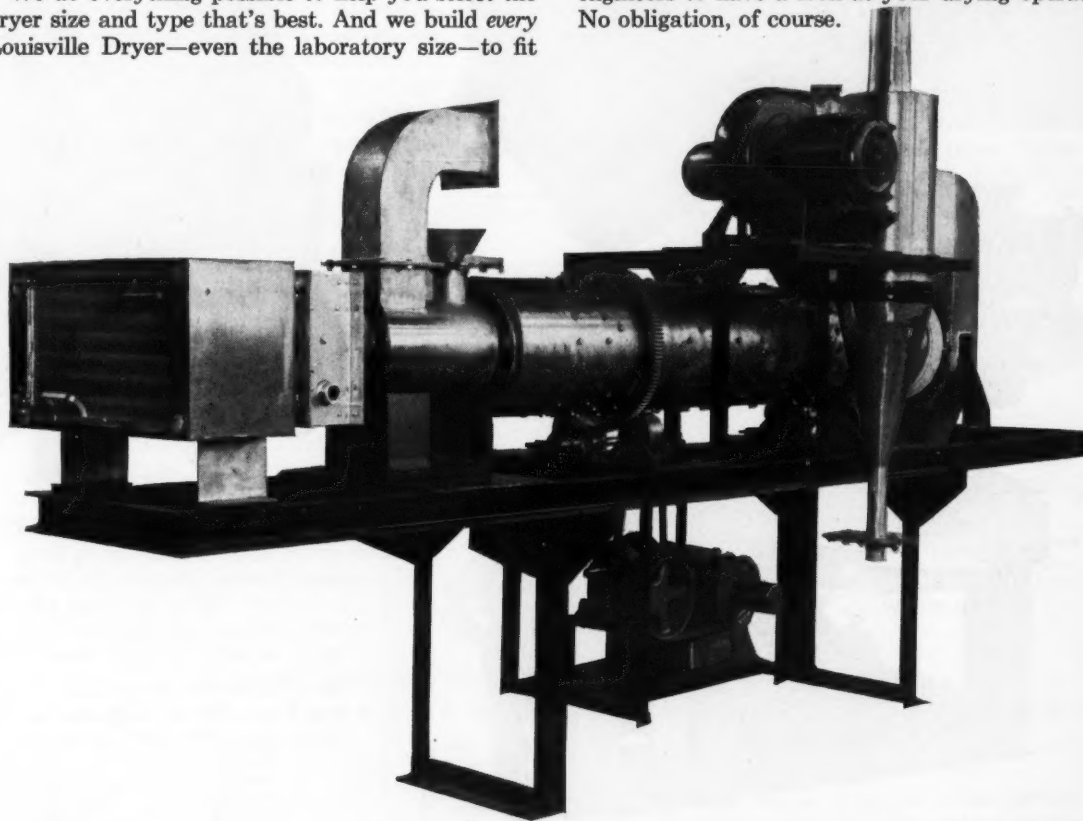
"Baby" Louisville Dryers do a man-sized production job for chemical firm

A large chemical firm has twice bought small, laboratory-size Louisville Dryers to serve as pilot plants for new materials. In both cases, their engineers were amazed to find the pilot dryers were producing sufficient quantities to supply the market!

We do everything possible to help you select the dryer size and type that's best. And we build every Louisville Dryer—even the laboratory size—to fit

the job, and to give years of satisfactory performance at rock-bottom maintenance cost.

Let Louisville's 53 years of drying experience, spanning thousands of installations for all types of industry, work for you. Why not ask one of our engineers to have a look at your drying operation? No obligation, of course.



### LOUISVILLE DRYING MACHINERY UNIT GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer Sales Offices: 139 So. Fourth Street, Louisville 2, Kentucky • 380 Madison Ave., New York 17, New York

General Offices: 135 So. LaSalle Street, Chicago 90, Illinois

In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario

OFFICES IN ALL PRINCIPAL CITIES

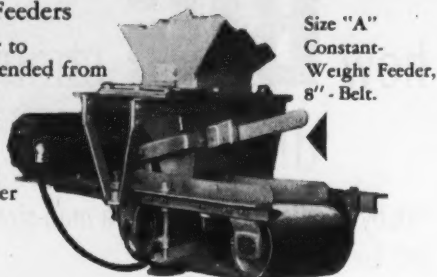
When inquiring check CP 6387 opposite last page

## LOW INSTALLED COST

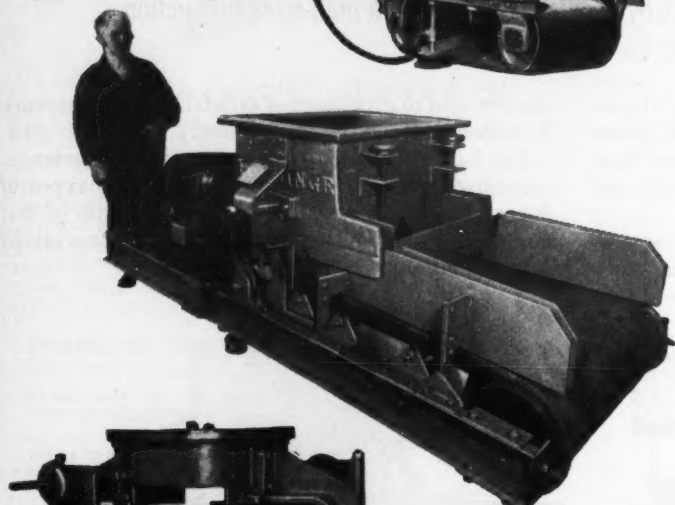
### All HARDINGE Feeders

from 100 POUNDS/hour to 100 TONS/hour are suspended from the feed bin which:

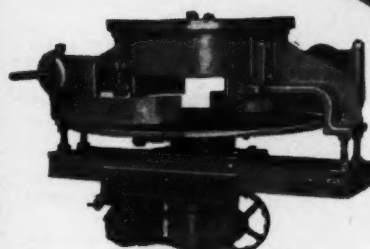
- Eliminates costly feeder support structure
- Provides accessibility to equipment following feeder



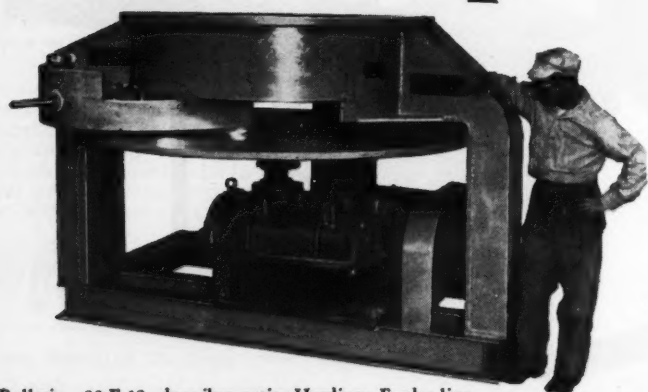
Size "A"  
Constant-  
Weight Feeder,  
8' - Belt.



Size "D" Constant-  
Weight Feeder,  
36' - Belt.



30" Disc Feeder



84" Disc Feeder

Bulletin 33-E-13 describes entire Hardinge Feeder line.

# HARDINGE

COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works  
New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco

When inquiring check CP 6388 opposite last page

## PROCESSING

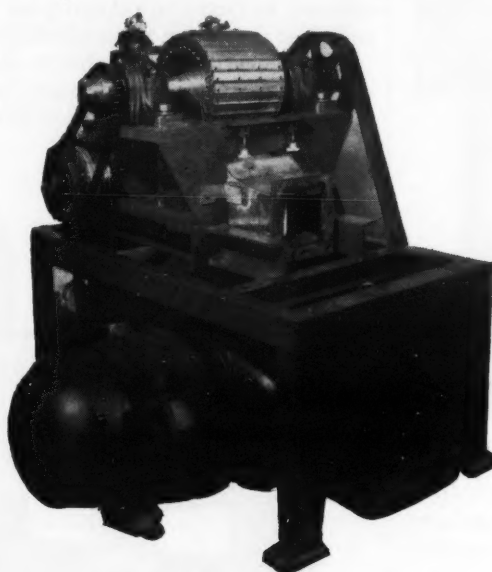
### Cutter turns out over 5 1/2 million plastic pellets per min . . .

product uniform in size; operation is dust-free

**Uses:** Designed for cutting extruded plastic rods into pellets.

**Features:** Machine can be made to cut wet or dry stock. Pellets are uniform in size and dust-free. Operation makes little noise. Unit has 30 fly knives and may be operated up to 2000 rpm.

**Description:** Cutters (Plastic Pelleters) are made in two sizes — one with 5-3/4" throat width, other with 10" throat width. Latter can take 120 rods (3/64" diam) and produce over 5 1/2 million pellets per minute (with cutting element running at 1600



Cutter has 30 knives, makes little noise

rpm). Cutting element, feed rolls, and other parts in contact with product can be made of stainless steel. Pulling, stretching, and feed rolls can be designed to suit individual requirements.

(Plastic Pelleters are product of Taylor, Stiles and Co., Dept. CP, 21 Bridge Street, Riegelsville, New Jersey. Check CP 6389 opposite last page.)

### Semi-standard design speeds up delivery of exchangers . . .

can be shipped within 2-3 weeks; choice of optional features

**Uses:** Designed for wide variety of heat transfer applications in chemical and petroleum industry.

## CATALYST CONTAMINATION CURED BY REMOVING ENTRAINMENT IN DISTILLATION UNIT

Equipment Costing \$15,000

Pays Out In Under A Week

### For Large Southwestern Refinery

It was not a difficult problem to trace the cause of mounting catalyst losses to a cat unit feed so poor in color that it was essentially black. Entrainment of liquid from the bottom of the still column could be the only answer.

Here was a situation where a Metex Mist Eliminator would remove the entrainment—but what else might happen? Would this knitted wire mesh separator cause excessive pressure drop? How quickly would it become plugged by coke deposits and make the column inoperable?

Calculations by one engineer showed that the total cost of installing a 25-ft diameter Mist Eliminator, including designing and erecting supports within the still, was approximately \$15,000—less than a week's catalyst loss. After considerable study the decision was made, and the Mist Eliminator installed during the next routine turnaround.

When the first run of cat unit feed came from the remodeled crude distillation unit, it was crystal clear and water white. Throughout the normal run no differential pressure across the screen was found.

The problem was solved. Catalyst losses dropped sharply. And the Mist Eliminator has paid for itself in a matter of days.

Have you really analyzed your entrainment costs, and checked the savings a Mist Eliminator could make for you? Perhaps you are losing valuable end products in the exhaust stream. Perhaps you have a nuisance contamination problem. Perhaps the entrainment created in one vessel is causing trouble in a subsequent operation. For entrainment is an inevitable result of most processing and refining operations.

Metex Mist Eliminators perform just one function—and they are doing it in more and more refining vessels every day. They remove liquid entrainment—efficiently and economically—wherever it may occur.

Why not write today for more information on Metex Mist Eliminators. Or better yet, send data on your particular entrainment problem. We'll be glad to have our engineers check this, and send you our recommendations and suggestions. Metal Textile Corporation, Roselle, New Jersey.—(Adv.)

When inquiring check CP 6390 opposite last page

CHEMICAL PROCESSING

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**Features:** Exchangers can be shipped within two or three weeks. Basic design is standard, but other optional design features may be specified. Nozzles, for example, may be any size or in any location required. Units may be specified with or without expansion joint.

**Description:** Heat exchangers are designed for pressures 150 psi and higher. Construction details meet ASME code specifications. Units also meet TEMA Class C standards.

Thickness of tube sheets is 7/8-inch and up. Bonnets and channels are 3/16-inch thick. Small stainless steel nozzles are schedule 40 stub ends, with ASA lap-joint flanges.

(Heat exchangers are product of Downingtown Iron Works, Inc., Dept. CP, Downingtown, Pennsylvania . . . or check CP 6391 opposite last page.)

#### Replaceable molded gum linings on cyclone classifiers

Design and features of cyclone classifiers are explained in illustrated 12-page bulletin. Four basic models are described, including detailed information on specific applications of each model. Also discussed are advantages of molded gum replaceable linings.

Bul 121 is issued by Equipment Engineers, Inc., Dept. CP, 41 Sutter Street, San Francisco 4, California. Specify CP 6392 opposite last page.



#### Process puzzle?

Wondering which types of equipment to use in the process you're planning or revising? Each month, CHEMICAL PROCESSING brings you news about latest developments in filters, stills, evaporators, heat exchangers, dryers, other process units. Check the alphabetical Product Directory, pages 237 to 240, to see what's discussed in this issue.

## YOU CAN CLEAN THIS STRAINER

**without interrupting production or contaminating the product**

Here's *positive* and 100%-continuous fluid cleaning.

Cuno AUTO-KLEAN Strainer is the *only* fluid cleaner on the market that works uninterruptedly. It's continuously-cleanable without stopping flow and without dismantling. An occasional turn of a handle—while in operation—combs out dirt accumulations. This can also be done *automatically*.

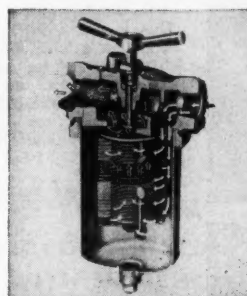
Thus—no loss of production, no chance of contaminating the product from exposure during element cleaning or replacement.

There's nothing to wear out and need replacement. All-metal Cuno AUTO-KLEAN Strainer will last as long as the equipment on which it is installed.

Models available for straining from .0035 to .062 in., a wide range of fluids, viscosities up to and above 300,000 SSU. Sizes to handle from a few to more than 4000 gpm. Send coupon for specific information about your fluid-straining problems.



**NON-STOP CLEANING** Turning metal discs past cleaner blades (periodically by hand or continually by motor or other automatic means) "combs out" all solids—even when imbedded in strainer element—without interrupting flow.



CUNO AUTO-KLEAN Strainer is guaranteed to remove all particles larger than specified.



**COMPLETE LINE**

*Fluid Conditioning*

Removes More Sizes of Solids from More Types of Fluids

MICRONIC (Micro-Klean) • DISC-TYPE (Auto-Klean) WIRE-WOUND (Flo-Klean)

Find Out How AUTO-KLEAN Can Cut Your Fluid-Cleaning Costs . . . Mail This Coupon

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Acids                  | <input type="checkbox"/> Fuel Oil                   | <input type="checkbox"/> Paint                      |
| <input type="checkbox"/> Air                    | <input type="checkbox"/> Fuel Tar                   | <input type="checkbox"/> Pyroxylin                  |
| <input type="checkbox"/> Alkali                 | <input type="checkbox"/> Gases                      | <input type="checkbox"/> Quenching Oil              |
| <input type="checkbox"/> Boiler Feed            | <input type="checkbox"/> Gasoline                   | <input type="checkbox"/> Resins                     |
| <input type="checkbox"/> Casein                 | <input type="checkbox"/> Grease                     | <input type="checkbox"/> Rust Proofing Compounds    |
| <input type="checkbox"/> Cleaning Solutions     | <input type="checkbox"/> Grinder Coolant            | <input type="checkbox"/> Sizing                     |
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| <input type="checkbox"/> Engine Lubricating Oil | <input type="checkbox"/> Oils                       | <input type="checkbox"/> Wax                        |

OTHERS \_\_\_\_\_

Cuno Engineering Corporation Department 168  
100 South Vine Street, Meriden, Conn.

Please send me a free copy of your AUTO-KLEAN bulletin. I am especially interested in the services checked.

Name.....Title.....

Company.....

Address.....

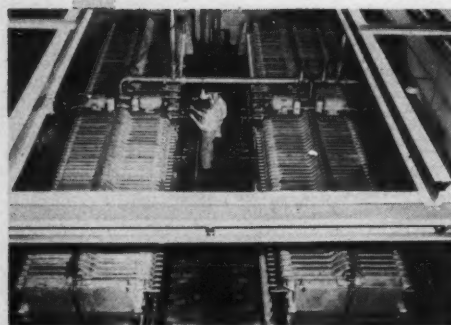
City.....State.....

PLEASE ATTACH COUPON TO YOUR BUSINESS LETTERHEAD

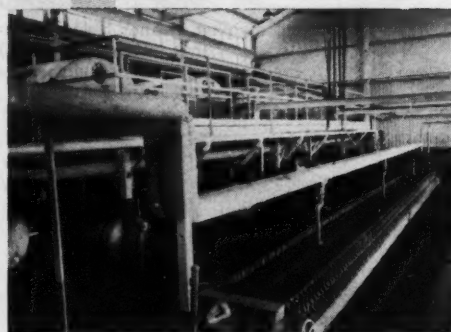
When inquiring check CP 6393 opposite last page

## Filter Presses Offer Many Variations to Improve Processing

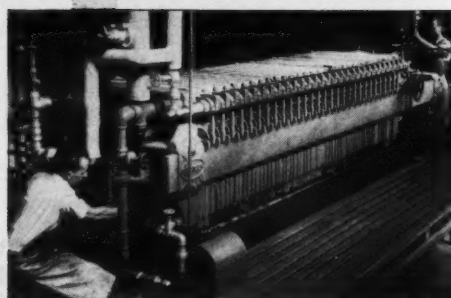
With Shriver filter presses it isn't a matter of just cake recovery or clarification. There are many operations that can be performed in a filter press or in some variation of the filter press design. Here are but three of many examples worth investigating.



These are Shriver brewery mash filters, each double-sectioned, with 40 chambers per section, which can be operated independently. Uniform, thorough extraction of the mash this way saves time, sparge water, labor, fuel and power and improves spent grains and produces drier, sweeter, more saleable filter cake.



This is not a filter press at all but a long, multiple chamber press for cooling and molding wax and similar substances into cakes of uniform size, weight and appearance, without shrinkage.



For versatility this steam heated Shriver Filter Press does about everything—filters, washes the cake, extracts all liquid, and melts the cake, all with the turn of a few valves.

There are many applications for Shriver Equipment in its multiplicity of designs, for cutting operating costs and producing better quality. The Shriver catalog tells how. Get a copy.



**T. SHRIVER & COMPANY, INC.** • 846 Hamilton St., Harrison, N. J.

Filter Presses • Filter Media • Diaphragm Pumps

Marco Centrifugal Co.  
San Francisco 7, Calif.

Process Eng. & Equip. Co.  
St. Louis 19, Mo.

The Watts Co.  
Houston, Tex.

Richardson Agencies, Ltd.  
Montreal, Que.

When inquiring check CP 6394 opposite last page

## PROCESSING

### Flotation unit's principles, design discussed

Flotation unit for clarification, water recovery, product recovery, and pollution elimination is described in four-page bulletin. Called the Aeroflot, device is reported to achieve maximum separation of particles at lowest cost and maximum speed. Cross-sectional drawing and flow diagram illustrate unit's operation.

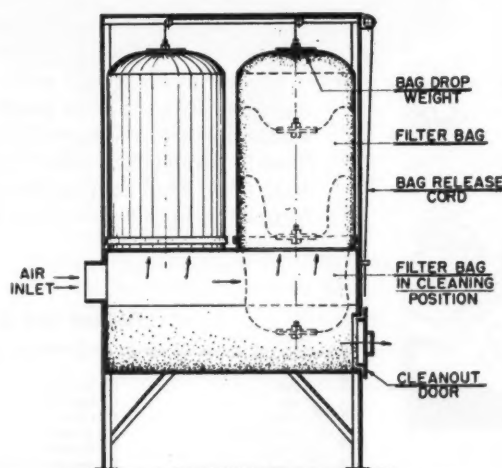
"Aeroflot" is issued by Graver Water Conditioning Company, A Division of Graver Tank and Mfg. Co., Inc., Dept. CP, 216 West 14th Street, New York 11, New York. When inquiring reader may simply specify CP 6395 on handy Reader Service slip which is located opposite last page.

### Simplicity, economy featured in fiber-dust collector . . .

large-diameter cloth bags permit accumulation of large volume of material

**Uses:** For removing lint or other fibrous materials from air streams.

**Features:** Large-diameter cloth bags permit accumulation of large volume of material without impairing efficiency. Unit is simple, compact, and economical to operate.

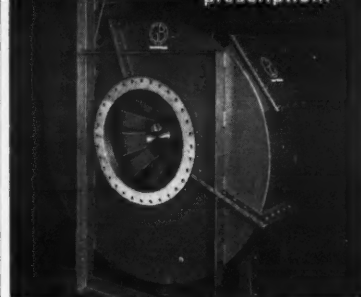


Cross-sectional view illustrates design and operation of fiber-dust filter

**Description:** Filter can be installed in any existing system. To remove collected mat, filter bag is turned inside out by slackening bag release cord, permitting the bag drop weight (see photo) to reverse bag and cause filter mat to break. Settled material is then transferred to suitable container for disposal.

## How is your Corrosion Resistance?

If your problem is moving corrosive agents thru a blower system, General's stainless steel neoprene or chemical coated construction is the right prescription.



General designed Pressure Blower, 35" static pressure with capacity of 10,000 CFM.

Blower failures, occurring within 6 month to two year periods, prompted Liquid Carbonic Corporation's Cincinnati plant to install this General Blower design. The blower is designed to handle highly corrosive flu gases. After 5 years of service, the fans are unaffected. Similar installations have since been made in other Liquid Carbonic plants. We invite you to consult with our engineering department if your problem is moving air, heat, gases, or materials.



**GENERAL BLOWER COMPANY**

**LUNGS FOR INDUSTRY**

DESIGNERS • ENGINEERS • MANUFACTURERS OF FANS, BLOWERS, EXHAUSTERS AND RELATED INDUSTRIAL EQUIPMENT

8603 FERRIS AVENUE • MORTON GROVE, ILL.

When inquiring check CP 6396 opposite last page

CHEMICAL PROCESSING

Filters  
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## PROCESSING

Filters range in capacity from 1250 to greater than 20,000 cfm. Latter has 400 sq ft filter area and measures 12'-10" long, 6'-6" wide, and 14'-6" high. Operation is positive, requires little maintenance.

(Type FD fiber-dust filters are product of The Ducon Company, Dept. CP, 147 East Second Street, Mineola, L. I., N. Y. Check CP 6397 opposite last page.)

### **Semi-portable vibrating sieve weighs only 57 pounds . . .**

operates on 110v, 60 cy AC; fits over drums

**Uses:** For removing sand, grit, rust scale, and other impurities from paints, dyes, and liquids.

**Features:** Lightweight (57-lb) units can be readily moved from one position to another. Sieves are easily disassembled for cleaning. Vibrators are sealed against liquids, and entire unit requires only 10-3/4" headroom.

**Description:** Vibrating paint sieve is constructed entirely of aluminum alloy. Three-legged frame base which supports circular screen section and vibrators is of sufficient width (30" base span) so that it can be placed over large drum, barrel or other circular opening.

Vibration is produced by two electric vibrators mounted at compound angle on base frame. Their 3600 vibrations per minute produce a sharp impact-



Compact vibrating sieve can be readily moved from one position to another

ing screen cloth action that reduces blinding and increases screening rate. Amplitude of vibrations may be varied by adjusting rheostat on controller. Standard units operate on 110-volt, 60-cycle AC line.

Sieves are not furnished with unit, but are available in No. 10 to No. 325 mesh, in high-tensile phosphor bronze or stainless steel.

(Vibrating sieves are product of Syntron Company, Dept. CP, Homer City, Pa. . . . or for more information check CP 6398 opposite last page.)

## • FASTER ULTIMATE DISPERSION, FASTER DISSOLVING WITH THE COWLES DISSOLVER

**2 to 20 times faster!** In ultimate dispersion, dissolving and disintegration of materials, the Cowles will do the job 2 to 20 times faster than conventional machines . . . will cut down your time per batch. You save on space. You save on labor. You save on horsepower. Cowles Dissolvers are easy to operate and clean, are of rugged construction, need little maintenance.

**Where dispersion, milling and post-mixing are involved,** the Cowles functions as an ultra-fast pre-mix unit—guaranteed to give *all mills* greater volume production—faster ultimate dispersion—and fastest post-mixing.

**In chemical processing,** the Cowles is an efficient, high speed reactor—offered in all types of corrosion resistant metals—with glass lined tanks—with all types of heating and cooling systems—to operate under pressure, vacuum or with reflux returns. For gas-liquid—for liquid-liquid—for solid-liquid reactions—investigate the Cowles.

The Cowles Dissolver is **extremely versatile**, adapting easily to any mixing, dispersion or dissolving job. It will be specifically engineered to meet the exact requirements of your operation.



*if you process . . .*  
Plastics • Resins • Paints  
Vitamins • Plasticsols  
Nitro-Cellulose Lacquers  
Rubber Solutions • Inks  
Various Chemical Agents  
Organisols • Gum Solutions  
Enamels • Biologicals  
Coatings • Explosives  
... the Cowles  
Dissolver will increase  
your production,  
handle even high  
viscosities,  
increase profits!

## HERE'S NEWS

### A NEW DISSOLVER & MILL

### COMBINATION FOR HIGH-SPEED, HIGH-VOLUME PRODUCTION!

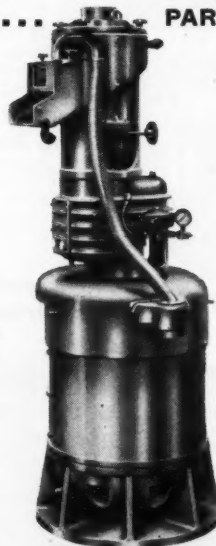
The news is—the owners of Morehouse Industries have purchased the Cowles Dissolver operation of the Cowles Company, Inc. of Cayuga, N.Y. It means—an unbeatable combination of processing equipment and technical know-how from one source—available through an expanded Morehouse-Cowles distributing organization.

## • FASTER... PARTICLE REDUCTION WITH MOREHOUSE MILLS

*if you process . . .*  
Paints • Inks • Foods  
Chemicals • Plastics  
Lubricants • Ceramics  
... you can increase  
volume and profits  
with Morehouse  
Mills!



Morehouse-Cowles, Inc.  
1150 San Fernando Rd.  
Los Angeles 65, Calif.  
Sales Offices in  
Principal Cities (Cable  
Address "MORESPEED"  
Los Angeles)



These increases in production guaranteed... up to 4 times the volume of ordinary mills when used with conventional pre-mixers . . . when used with Cowles the production jumps up to 10 times that of ordinary mills! For grinding, homogenizing, emulsifying, dispersing, disintegrating, blending, Morehouse Mills have been further improved to give even greater production volume!

Modern Morehouse Mills are low in first cost, easy to maintain, unusually compact, lightweight, completely proved in the field. Made only by Morehouse Industries of Los Angeles.

## • FASTEST—MOST ECONOMICAL PRODUCTION WITH COWLES DISSOLVER—MOREHOUSE MILL COMBINATIONS!

Morehouse-Cowles sells speed—volume production—higher profits for your entire operation, gives you **terrific flexibility in your production line!** Ask for pre-test of your materials by Morehouse-Cowles technicians. Ask for full trials in your plant with any size equipment. Inquire about leasing arrangements and time payment plans in U.S. and Canada. Both the Cowles Dissolvers and Morehouse Mills are fully guaranteed. **Write today!**

When inquiring check CP 6399 opposite last page

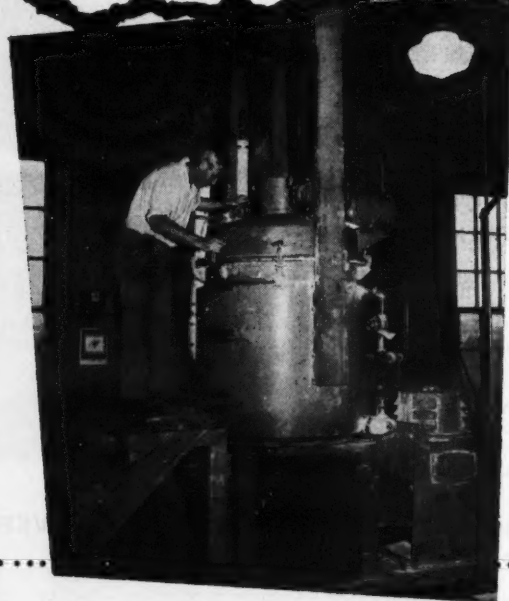
"With our  
Abbe Dispersall Mixer  
we have reduced our  
labor cost and get  
a much finer paste"

We are using our Abbe Dispersall Mixer in the manufacture of heavy pastes, and find that we have reduced our labor cost and get a faster mix by using this piece of equipment over the old type of equipment which we were using. In the old mixers we could mix only 300 lbs. at a batch, whereas with the Abbe Mixer we can mix 900 lbs. at a batch.

We purchased this piece of equipment complete with vacuum pump, and we find that we get a very much finer paste due to the fact that mixing under vacuum, we do not mix in a lot of air bubbles.

Yours very truly,

COMPANY



Abbé Dispersall Mixer in the manufacture of heavy pastes mentioned above.

**ABBÉ ENGINEERING COMPANY**  
50 Church Street • New York 7, N. Y.  
Address Department 46

When inquiring check CP 6400 opposite last page

## PROCESSING

**Portable demineralizer  
has 1-2 gpm max  
flow rate . . .**

can purify 250 gal 100-ppm  
or 125 gal 200-ppm water

**Uses:** For producing small quantities of demineralized water.

**Features:** Compact, portable unit has capacity of about 1500 grains total dissolved solids. During each cycle or run, it is capable of demineralizing 250 gal of raw water containing 100 ppm total electrolytes, or 125 gal of raw water containing 200 ppm total electrolytes.

**Description:** Demineralizer contains a bed consisting of mixture of Permutit Q cation exchanger, and Permutit S anion exchanger. Unit produces water of low total dissolved solids, low CO<sub>2</sub>, low silica content, low conductivity.

In service, inlet hose is connected to raw water supply, and outlet is connected into pipe line or left free to be put into a container. Flow rate is 1 to 2 gpm maximum. Faucet to which raw water inlet adapter is fastened is used to regulate flow.

Conductivity meter (used to indicate dissolved solids content of effluent) comes with 4-ft length of wire for attaching to conductivity cell, and 6-ft cord for connecting to standard 110-volt, 60-cycle supply.

(Model MBD-6A portable demineralizer is product of The Permutit Company, Dept. CP, 330 West 42nd Street, New York 36, N.Y. Check CP 6401 opposite last page.)

## Packaged liquid chillers pictorially presented

Packaged liquid chillers are pictorially and graphically illustrated in 16-page bulletin.

"Packaged Liquid Chillers" is issued by Worthington Corporation, Dept. CP, Harrison and Worthington Avenues, Harrison, N. J. Specify CP 6402 opposite last page.

## "NATIONAL" PROVIDES THE Economical Solution TO Any Drying Problem!

No matter what your product may be, it can be dried or otherwise processed at a lower cost per pound or other unit, in one or more of the various types of "NATIONAL" equipment.

High-speed production; maximum effective use of the drying medium under finely adjusted control; adaptability to existing plant conditions and future expansion; and the assurance of long, trouble-free operation are among the important reasons why "NATIONAL" machines are being erected in more and more chemical plants throughout the United States and in other countries.

## NEW "P-4" CONSTRUCTION

The result of a radically new approach to simplified Dryer construction, "P-4" Construction provides a precision-built, prefabricated structure, with trussed-and-tensioned insulated panels. It assures a more rigid, durable machine, with installation time in your plant reduced as much as 50%.

## "ADD-A-UNIT" DESIGN

This unique accomplishment of "NATIONAL" engineering provides alternatives which are both practical and economical — (1) simplification of the initial installation based on present requirements; (2) maximum adaptability to step-by-step future expansion.

## OTHER SPECIAL FEATURES

Patented Super-Power Fans, made in our own shops to specifications developed through years of industrial drying experience. Patented Indexing Orifices, Turning Vanes and other devices and arrangements assure unequalled versatility and precision in air distribution and control. The heat source may be steam, gas, oil or other medium.

Single and Multiple Conveyor Dryers; Cabinet and Tunnel Type Truck Dryers; Extruders; Drying and Baking Ovens; Equipment for Plastic Film and other Continuous Web Processing; Test Dryers.

Right: Large Multiple-Unit, Multiple Apron Conveyor Dryer.

Below: Fourteen-Section Multiple-Unit Single-Apron Conveyor Dryer With Three-Zone Control.



**THE "NATIONAL" DRYING MACHINERY CO.**  
LEHIGH AVENUE and HANCOCK STREET  
PHILADELPHIA 33, PENNA.

New England Agent: JONES & HUNT, INC., Gloucester, Mass.  
Cable Address: "NADRYMA" — W. U. Code

When inquiring check CP 6403 opposite last page

CHEMICAL PROCESSING

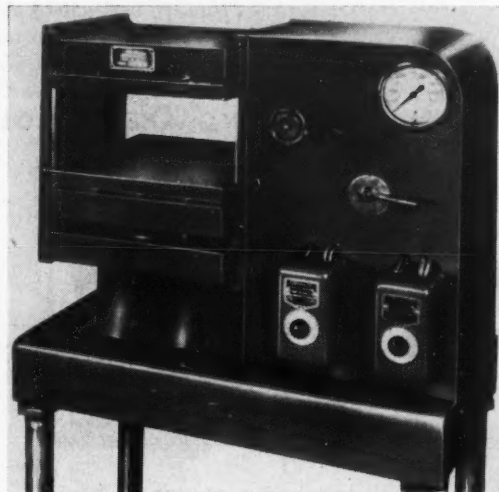


### Boost pump controls pressure in molding press

**Uses:** For precision molding of rubber, plastic, and other materials.

**Features:** Unit is powered by air-operated boost pump which maintains accurate and consistent pressure on platen area. Platens are equipped with individual controls which regulate hydraulic pressure within range of 50 to 4000 psi.

**Description:** Compact, simple-to-operate press is equipped with electrically heated 12 x 12" and 14 x 14" platens. Cooling system reduces transfer of platen heat to ram, ram pot, hydraulic oil, and



Platens are equipped with individual controls

packing. System is also said to prevent acceleration of chemical changes in oil, maintain viscosity and acidity of oil, and prevent deposition of gums and varnishes on highly polished surfaces.

Chromium-plated ram insures perfect fit with the packing and is said to reduce packing changes to mere minutes.

(Model 60-12 hydraulic press is product of Atlas Hydraulics, Inc., Dept. CP, 3576 Ruth Street, Philadelphia 34, Pa. Check CP 6404 opposite last page.)

### Bulletin cites advantages of glass mat air filters

Advantages of glass mat cartridge-type air filters are discussed in four-page illustrated folder. Unit consists of cadmium plated steel frame which contains replaceable cartridge.

"Aerolsolve AirFilter" is issued by Cambridge Filter Corporation, Dept. CP, 738 Erie Boulevard E., Syracuse, N.Y. Specify CP 6405 opp. last pg.

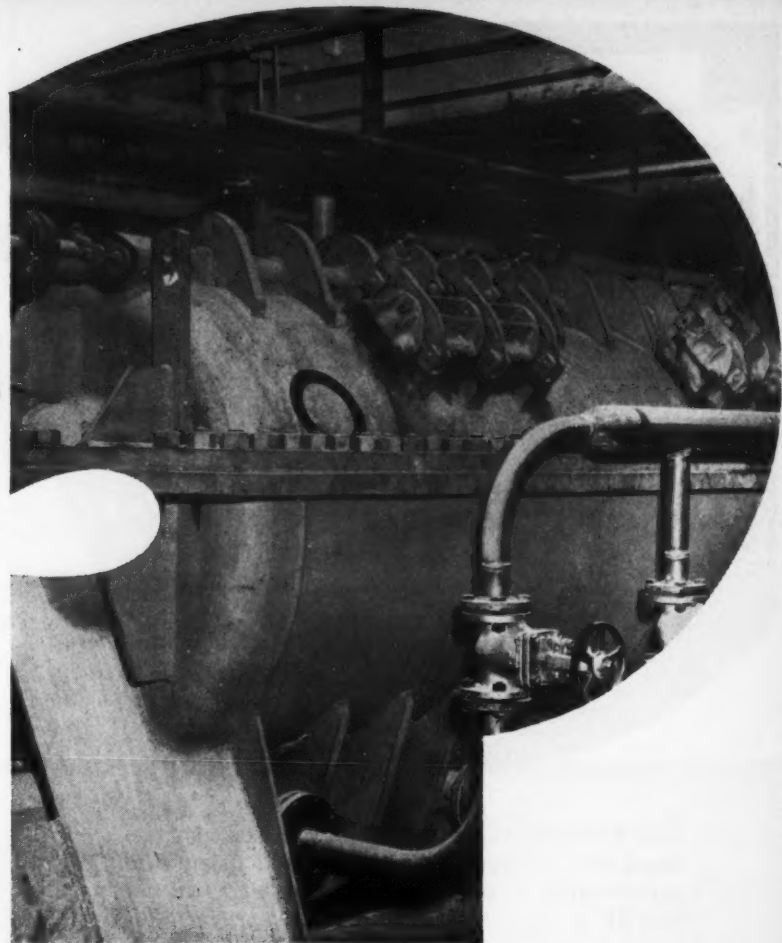


## We'll GUARD your Confidential Process Problems...

while we help you  
solve them!

HERE'S A CASE where another big company had complete confidence in G-B... our ability to solve a tough problem, and keep it confidential.

The filter, in this particular process, was designed and engineered to filter salt from a dope-like material under very high pressure and temperature... complicated by the presence of a highly caustic solution. It has a filtering surface of 738 square feet, and will meet A.S.M.E. code requirements for pressures up to 150#. The filter uses a precoat... the cloth can be readily replaced by the customer. G-B filters of this type are available in all welded nickel and stainless steel construction... with solid or clad shell and solid filter element.



If it's a  
FILTERING OR  
EVAPORATING PROBLEM  
-and a tough one...  
it will Pay you to  
talk to G-B

G-B engineers have a wealth of filtering and evaporating "KNOW-HOW" you can use. They will consult with you, *without obligation*, to help you solve your problems. They will help you run tests in your own plant... or you are welcome to use G-B's own complete testing facilities.



**GOSLIN - BIRMINGHAM**  
MANUFACTURING CO., INC.  
BIRMINGHAM • ALABAMA

When inquiring check CP 6406 opposite last page



The "Entoleter" Impact Mill can assure you complete dispersion . . . compact installation . . . simplified maintenance . . . and will process up to 25 tons per hour!!!

Whether you use

$$\gamma = \frac{2.3 \log_{10} \frac{I_o}{I_n}}{t}$$

to determine the efficiency of your color dispersion or not . . . we know you can get maximum . . .

- Intensity
- Extension
- Uniformity

with the "Entoleter" Impact Mill. May we process a sample of your product for your evaluation?

The trademark "ENTOLETER" is your guarantee of complete satisfaction

**ENTOLETER DIVISION**  
The Safety Car Heating and Lighting Company, Inc.  
1185 Dixwell Ave., New Haven 4, Connecticut

When inquiring check CP 6407 opposite last page

## PROCESSING

### Water conditioning equipment pictured, described

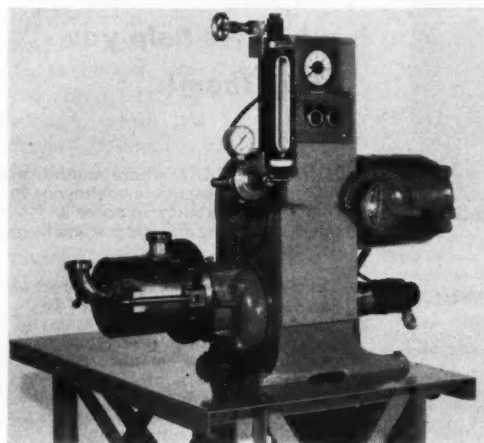
Line of water conditioning equipment and accessories is described in four-page bulletin. Included are demineralizers, softeners, deaerators, filters, blowoff systems, dealkalizers, purifiers, and valves.

Bul 6210 is issued by Cochrane Corporation, Dept. CP, 3135 N. 17th Street, Philadelphia 32, Pa. Specify CP 6408 opposite last page.

### Electropolished interior finish eliminates product adhesion in foam latex blender

**Uses:** For blending gel and zinc with partially foamed latex in the production of foam latex. Blender is designed for use with manufacturer's continuous automatic mixer to eliminate shutdowns caused by natural tendency of latex to coagulate and clog foaming heads during mixing process.

**Features:** Machine has all stainless steel construction. Electropolished smooth interior finish re-



Blender has capacity of 2000 lb/hr foam latex

sists latex adhesion. All inside pockets and dead ends have been eliminated.

**Description:** Compact blender occupies 2 x 3-foot floor space and weighs 155 pounds (mixing head, 15 pounds; motor, 140 pounds). Capacity is about 2000 pounds of foam per hour. Variable-speed 1-hp motor has speed range of 150 to 1050 rpm. Blending head measures 5" ID x 6" length.

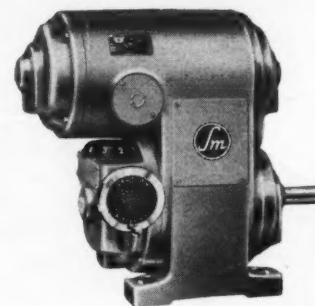
In operation, zinc oxide slurry is introduced into the blender and atomized with a jet of air which not only distributes the gel more quickly, but also finishes off foam structure.

(5M foam latex blender is product of E. T. Oakes Corporation, Dept. CP, Commack Road, Islip, L. I., N. Y. Check CP 6409 opposite last page.)

## Production & Quality Up, Rejects Down With Speed-Trols

Mr. W. J. Johnson, President of Modern Plastic Machinery Corp., leading manufacturer of plastic processing equipment, states that highly versatile, dependable Speed-Trols increased production due to wide speed range, less maintenance and down-time; reduced rejects and improved quality because of accurate, positive speed regulation; saved 20% floor space because of compactness.

### STERLING SPEED-TROL



### GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

**Equipment adaptation to:** Sequence synchronization — operators' abilities — load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

**Process control of:** Temperature — viscosity — level — pressure — flow — etc.

**Time control of:** Baking — drying — heating — cooking — pasteurizing — soaking — chemical action — etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality & profit.

**20-page illustrated catalog . . .** Sterling Speed-Trol, Slo-Speed, Klost and Klost-Tite Electric Power Drives. Write for catalog No. 204

**STERLING**  
ELECTRIC MOTORS

Plants: New York City 51; Chicago 35; Los Angeles 22; Hamilton, Canada; Santiago, Chile  
Offices and distributors in all principal cities

When inquiring check CP 6410 opposite last page

CHEMICAL PROCESSING

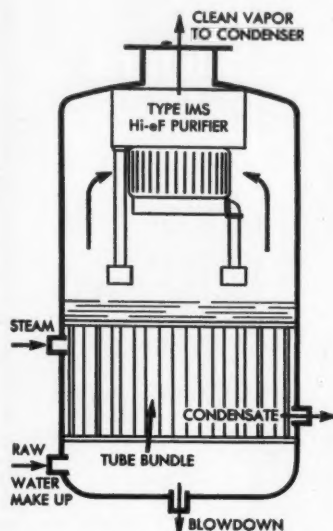


**Purifier eliminates 99%  
of particle carryover  
in evaporators . . .**

improves purity control, needs  
no servicing or cleaning

**Uses:** Device removes entrainment from evaporators, eliminating carryover of particles to next stage. In some cases, use of device permits evaporators to be operated at higher capacities.

**Features:** Purifiers are reported to remove 99% of carryover. Operates



Cross-section shows installation of purifier in vapor chamber

erator never needs to worry about servicing or cleaning device.

**Description:** Device is installed at outlet of vapor chambers. Purifier operates on principle of controlled centrifugal force, eliminating need for moving parts or filters. Units are made in wide range of metals and are available in many sizes.

In distillate salt water service, units deliver vapor containing no more than 0.22 grains of chlorine per gallon of distillate, with shell concentration of 1.5/32 salinity.

("HieF" purifiers are product of the V. D. Anderson Company, Dept. CP, 1935 West 96th Street, Cleveland 2, Ohio. Check CP 6411 opposite last page.)

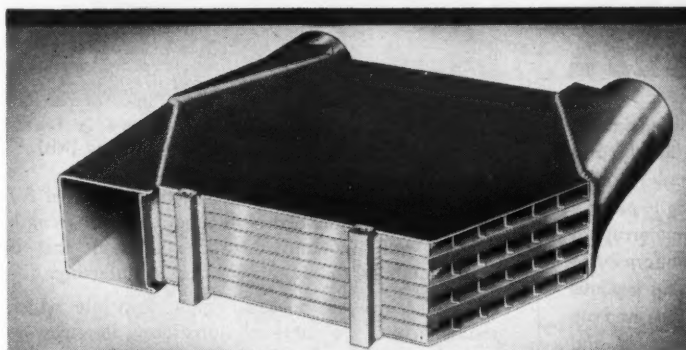
# Better solutions to heat transfer problems ... using Trane equipment

**If you have a heat transfer problem** involving close temperature approaches, multi-stream exchange or low temperatures—if you must consider cost, space or weight—chances are TRANE can help you find a new and better solution.

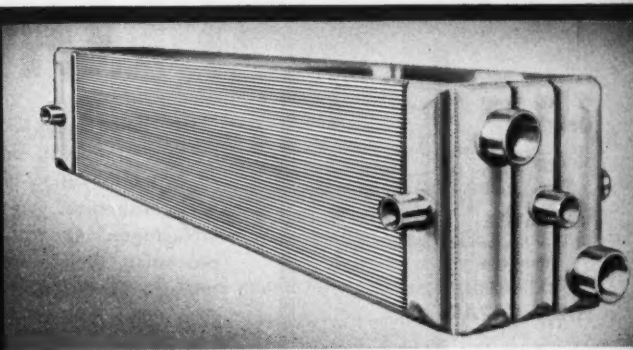
**TRANE Brazed Aluminum** and **TRANE Fin-and-Tube** heat transfer surfaces offer a design flexibility that permits construction of units to

handle practically any specification of heat transfer, pressure drop, volume, number and direction of passes desired.

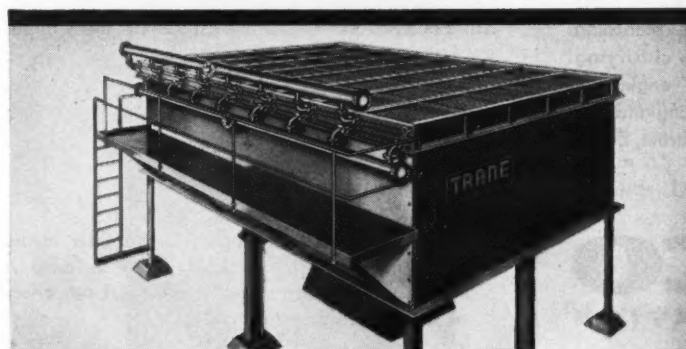
**Our 30 years' experience** in heat transfer is at your disposal. For complete information just contact your nearest TRANE Sales Office or write on your company letterhead to The TRANE Company, La Crosse, Wisconsin.



**COOLING ELECTRONIC EQUIPMENT** for aircraft and mobile installations places severe limitations on heat exchanger size and shape. Inherent flexibility of TRANE Brazed Aluminum makes possible wide variety of special shapes, more heat transfer in a given shape.



**LOW TEMPERATURE PROCESS** plants are one of the major applications of this compact counter-flow brazed aluminum core. TRANE units make close temperature approaches practical and economically obtainable. Available for test pressures up to 1200 psi.



**DIESEL ENGINE COOLING**, petroleum processing or pipeline transmission—these are but a few of the applications of TRANE Fluid Coolers. Two-speed motor and automatic shutters over coil permit close control, maximum power savings.

# TRANE

MANUFACTURING ENGINEERS

*One source, one responsibility for:  
Air Conditioning • Heating • Ventilating  
Heat Transfer Equipment*

The Trane Company, La Crosse, Wis. • Eastern Mfg. Div., Scranton, Pa.  
Trane Co. of Canada, Ltd., Toronto • 90 U. S. and 15 Canadian Offices



**FOR  
CONTINUOUS  
MIXING...**

**FLOMIX®**

**UNIQUE**

— another Netco FIRST  
— patented (U.S. Pat.  
No. 2183859)

**VERSATILE**

— has mixed solutions  
from clay slip to penicillin.

**HIGH CAPACITY**

— installations in excess  
of 400 GPM and viscosities  
of 75,000 cP.

**PRESSURES**

— to 400 psi — higher  
pressures possible.

**TEMPERATURE**

— to 300° C.

Use Netco Flomix to combine liquids, gases and liquids, and liquids and solids as they flow through a pipe line. Flomix gives you these important advantages: ① fast, uninterrupted processing, ② increased uniformity of product, ③ simplified piping layouts, ④ complete elimination of intermediate storage tanks and mixing vessels, and ⑤ reduced maintenance.

Netco Agitation Engineers are ready to discuss the application of Netco Flomix to your continuous processing problems: for mixing, blending, reacting, washing, contacting, bleaching, absorbing, chlorinating, clarifying. Send specifications for engineered recommendations to New England Tank & Tower Co., 93 Tileston Street, Everett 49, Massachusetts.

**NETTCO**  
ENGINEERED AGITATION

When inquiring check CP 6412 opposite last page

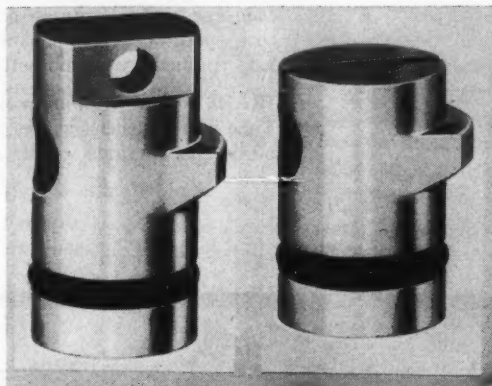
**PROCESSING**

**Replacement time cut to minutes  
by improved design camlock  
centrifugal nozzles**

**Uses:** Designed for use with all of manufacturer's standard models of centrifugal separators.

**Features:** Nozzles provide improved slurry flow plus maximum speed and ease of handling in replacement. Changing time is reported to be reduced from "hours to minutes."

**Description:** Centrifugal camlock nozzles are available in two models — flush-head and extended-head. Latter is designed for use wherever process liquors are apt to set. For flush-head nozzle, two



Centrifugal camlock nozzles are available in two models — flush-head (right) and extended head (left)

conventional screwdrivers are only tools required for removal. With extended-head model, a short length of steel rod, or standard drift pin, is all that is needed. Pin or rod is supplied by manufacturer.

Design incorporates hydraulic-flow principle which results in more streamlined slurry flow. Passageways within body of nozzles are machined and contoured. Nozzle is recessed in rotor bowl to permit free discharge of the jet at a fixed angle. Conventional "O"-ring provides positive seal of nozzle in the port.

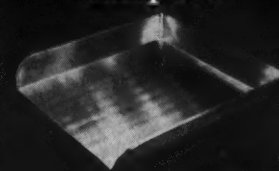
(Centrifugal camlock nozzles are product of Merco Centrifugal Company, Dept. CP, 150 Green Street, San Francisco 11, California. Check CP 6413 opposite last page.)

**Gives performance data  
for porous Teflon**

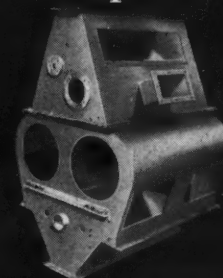
Performance data for porous Teflon filter media is given in two-page bulletin. Also included is information on thermal and mechanical properties of the fluorocarbon material.

Bul T-115 is issued by Porous Plastic Filter Company, Dept. CP, 30 Sea Cliff Avenue, Glen Cove, N. Y. Specify CP 6414 opposite last page.

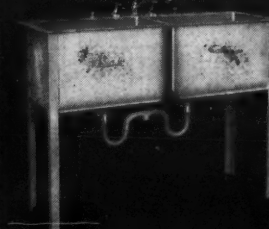
simple?



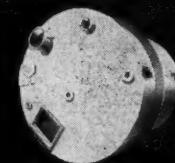
complex?



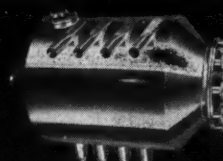
Littleford



fabricates it



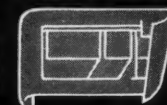
better... faster



and cheaper!

send us your blueprint  
for prompt estimate

FABRICATORS  
OF  
PLATE AND  
SHEET METAL  
PRODUCTS  
FOR INDUSTRY  
SINCE 1882



**LITTLEFORD**

LITTLEFORD BROS., INC.  
417 E. Pearl St., Cincinnati 2, Ohio

When inquiring check CP 6415  
opposite last page

CHEMICAL PROCESSING



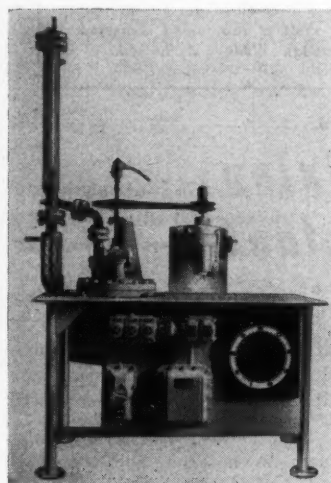
### Packaged pilot plant has many uses

**Uses:** For studying pilot plant reactions and distillations.

**Features:** Both endothermic and exothermic reactions, under pressures up to 150 psi, may be carried out in equipment.

**Description:** Reaction-distillation units are made up of 5-gal reactor (with recording temperature controller), agitator, condenser, and decanter. Gas is fed into reactor through hollow agitator shaft. This can also be used for inert gas blanketing.

Condenser may be arranged for operation in any position. Decanted



Compact, reaction-distillation pilot plant can be used to test and study hundreds of chemical processing operations

liquid can overflow into reactor or all of condensate can be returned to reactor by closing valve.

Three 2000-watt, thermostatically-controlled, tubular-strip heaters are clamped to outside of reactor. Agitator speed may be varied.

(Reaction-distillation pilot plants are product of The Patterson-Kelley Co., Dept. CP, East Stroudsburg, Pa. Check CP 6416 opp. last page.)

For more information on product at right, specify CP 6417 . . . see information request blank opposite last page. ➡



Fig. 1612

**Individually  
designed and  
custom built**

**for Unusual Requirements**

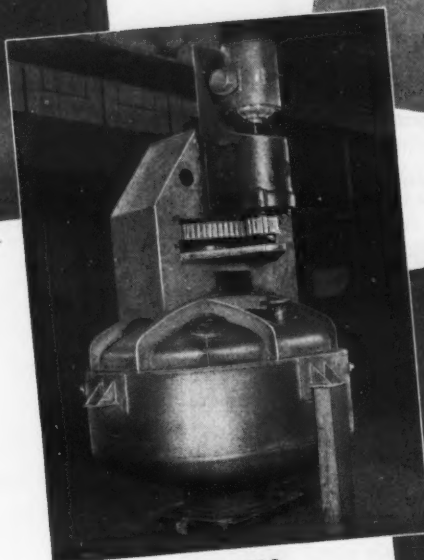


Fig. 1599



Fig. 1352

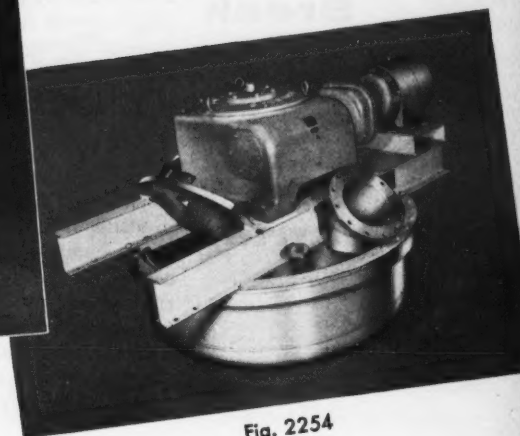
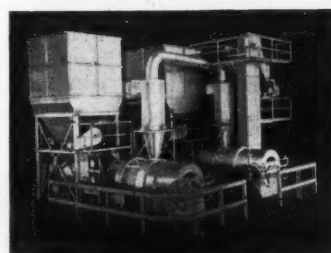
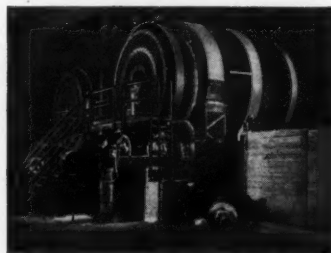


Fig. 2254



Two Complete Drying Systems, Can Be Operated Together—or Singly—to Meet Varying Plant Requirements.



Two Bartlett-Snow Batch Rotary Kilns, Preheating Charges for Electric Furnaces.

• Our wide experience and complete developmental, engineering, fabricating and erecting facilities enable us to solve the most unusual and exacting heat processing problems. Mild steel, stainless or special alloys.

The dished bottom stainless steel batch dryer (Fig. No. 1612 above) dries a finely divided catalyst with minimum dust loss. The liquid tight plug type discharge doors are opened and closed with remote control. Fig. No. 1599 is a steam jacketed dryer-crystallizer. Note the powerful drive and reducer. Fig. No. 1352 is a steam jacketed dryer fitted with a condenser where fines are reclaimed from the vapors. Fig. No. 2254 is a special stainless steel vessel for processing a catalyst used in defense activities. All the above units conform to A.S.M.E. U-69 unfired pressure vessel code. Don't gamble. Let us work with you on your requirements.

DESIGNERS

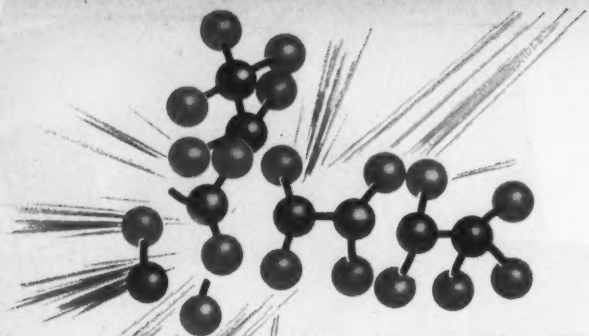
ENGINEERS

**BARTLETT  
B-SNOW**  
CLEVELAND 5, OHIO

FABRICATORS

ERECTORS

*Dryers • Coolers • Calciners • Kilns*  
"Builders of Equipment for People You Know"



## Break through the octane barrier

Now... you can go beyond the limitations of older analytical methods... analyze quickly and accurately for those compounds above the octanes that are gaining ever-greater importance. CEC's newest analytical mass spectrometer... Type 21-103C... quickly, accurately determines mixture components at mass numbers as high as 700... yet is equally at home in the field of gases and light liquids.

Only an hour or less is required for even complex mixture analyses (just minutes for key components) that once took weeks by fractional-distillation methods.

For fundamental petroleum and petrochemical research, for process development and for control, investigate the 21-103C. It makes an already important scientific tool—mass spectrometry—even more useful and versatile.

Complete details in our new brochure... send today for CEC 1800C-X9.



Ideal for exploratory analyses, the 21-103C registers every component of a sample... whether or not its presence is known.

## Consolidated Engineering

Corporation

ELECTRONIC INSTRUMENTS FOR MEASUREMENT AND CONTROL

300 North Sierra Madre Villa, Pasadena 15, California

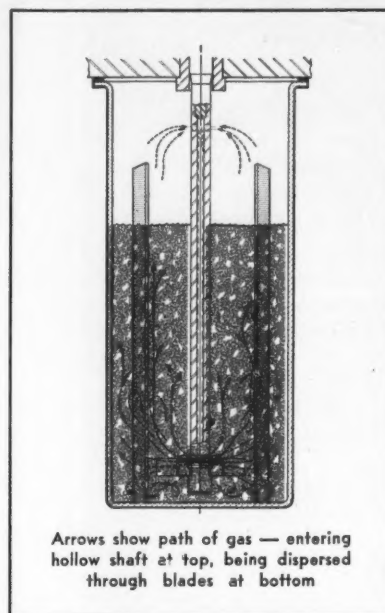
Sales and Service Offices Located in: Albuquerque, Atlanta, Buffalo, Chicago, Dallas, Detroit, New York, Pasadena, Philadelphia, Seattle, Washington, D. C.

When inquiring check CP 6418 opposite last page

## for the laboratory

*Just developed in studies by Drs. J. R. Snyder, M. C. Molstad, and P. F. Magerty, dispersing setups of this kind are now being made for small units. Larger models are expected to be in operation soon.*

Gas bubbles act as paddles for...

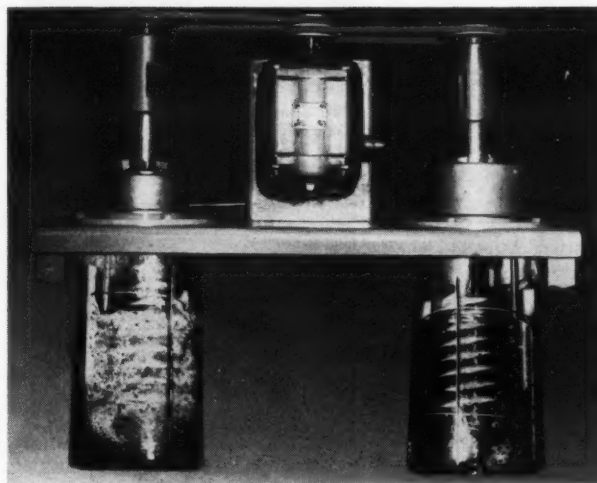


## really fast mixing in lab, pilot plant

High pressure autoclaves for laboratory and pilot plant can now be equipped with an agitator differing radically from conventional paddle designs. Chief improvement in performance comes in bringing gas, liquid and suspended solids into close contact quickly. In operation, small gas bubbles

traveling at high velocity are forced through the liquid. Gas-liquid-solid interfaces are much greater than those from paddle-induced turbulence.

Gas is drawn down through hollow shaft and dispersed in form of small bubbles. These bubbles are further dispersed by strong



Compare action of bubble-induced disperser (left) with conventional disperser. Shaft speed (two taken from same motor) is 600 rpm; action stopped by strobe



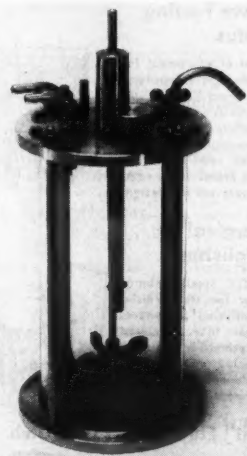
circumferential and vertical circulation.

Radial impellor blades are used to produce both these effects — but bubbles themselves play the role ordinarily taken by blades in agitating bulk of material. When shaft is rotated at speeds up to 650 rpm, suction in region of blades is sufficient to pull gas through. Bubbles immediately start off in fast circles because of blade rotation. But vertical baffles deflect their paths and shoot bubbles upwards. Solid catalysts suspended in liquid are also thoroughly dispersed in this process.

Repeated tests have borne out efficiency of this method of dispersion. High interfacial area accounts for the fact that reaction time has been decreased many fold. There is also basis for believing that reactions will take place at lower pressure. Plant size equipment to take advantage of this is contemplated.

(Dispersimax was developed in studies at the University of Pennsylvania and is produced by Autoclave Engineers, inc., Dept. CP, 860 E. 19th St., Erie, Pa. . . . or for more information concerning manufacturer's product reader may simply check CP 6419 on handy form opposite last page.)

#### **Stainless steel ball-bearings and sealed-in lubrication used on fermentor**



Laboratory and pilot plant stainless steel fermentor holds 5 liters in Pyrex jar. Air line, water line and sampling line are  $\frac{1}{8}$ " standard pipe size. Agitation is provided by perfectly centered  $\frac{3}{8}$ " diameter shaft fitted with four-blade propeller.

Fermentor has stainless steel ball-bearing housing, with sealed-in lubrication. Bearing construction eliminates freezing and contamination

of shaft. All submersible parts are 316 stainless steel. Base plate and head are 8" in diameter and height to top of agitator shaft is 16". Pyrex jar has 6" diameter and is 12" high.

(Fermentor is a product of New Brunswick Scientific Co., Dept. CP, 10 Hiram St., New Brunswick, N.J. . . . or for more information concerning manufacturer's product, reader may simply check CP 6420 opposite last page.)

**Now . . . the ultimate in safety!**



(Pat. Pending)

U. S. Patent  
No. 2,282,078



U. S. Patent  
No. 2,231,506

## **GLAS-COL**

Trademark Registered U. S. Patent Office

### **ELECTRIC HEATING MANTLES**

**Specialists in Laboratory and Pilot Plant Heating Problems**

For additional information on the new Glas-Col CO<sub>2</sub>-Purged Heating Mantle, ask for Bulletin 101.

## **the NEW**

## **Glas-Col CO<sub>2</sub>-Purged Heating Mantle**

Flashing of flammable vapors is practically impossible with this new Glas-Col CO<sub>2</sub>-Purged Heating Mantle.

Here's how it works: At the bottom of the mantle's aluminum housing, there is an inlet which permits a slow stream of CO<sub>2</sub> gas to pass through the interior of the heating mantle. Thus, the mantle's interior, and more particularly, the heating elements are continuously blanketed with CO<sub>2</sub> gas.

The new Glas-Col CO<sub>2</sub>-Purged Heating Mantle represents the most important advance in heating mantle design to date.

Glas-Col CO<sub>2</sub>-Purged Heating Mantles are available in a wide range of sizes\*, shapes, and types, in standard and custom-made models; in the new super-tough Glas-Col "R" fabric, as well as in glass or quartz fabrics.

Temperatures can be precisely controlled up to 650° C . . . by means of a variable transformer.

Glas-Col Apparatus Company, Inc., Dept. CP, 711 Hulman Street, Terre Haute, Indiana.

\*Capacities range 1-liter to 72 liters

When inquiring check CP 6421 opposite last page



## NEW Arnold O. Beckman MODEL F3 OXYGEN ANALYZER

with the meter on the door

New convenience has been built into the well-known F3 Oxygen Analyzer... a meter on the door provides readings at the sampling point for making calibration checks, process changes, etc. In fact, complete analyzing, calibrating and indicating components are now incorporated into the single F3 unit—at no extra cost!

### Use The Model F3

ON OPERATIONS LIKE THESE... TO MAKE SAVINGS LIKE THESE

#### COMBUSTION

Boilers, Kilns, Direct-Fired Heaters, Stills, etc.

Higher combustion efficiencies, at lower fuel costs

#### PROCESSING

Air Liquifraction... Processing Butadiene, Acetylene and Similar Gases

Better product quality with minimum oxygen or air contamination

#### PLANT SAFETY

Hydrogenation, Hydrotreating, Gas Compressors, Sulfur Grinding, etc.

Control explosive atmospheres, reduce fire risks, minimize plant and personnel hazards

### Unique Operating Principle

The various applications highlighted above are only a few of the many ways Arnold O. Beckman Oxygen Analyzers—industry's great new profit builders—are being used by progressive operators to boost profits, cut costs.

These are the *only* oxygen analyzers that *continuously* measure process streams by an advanced magnetic principle that provides *direct physical measurement of the oxygen itself*—not of some secondary relationship.

Heart of the unit, as illustrated, is a dumbbell-shaped test body suspended in a magnetic field. Sample gas surrounding this test body causes it to rotate in the field, depending upon the oxygen content of the gas. The movement of a light beam, reflected by a small mirror on the test body, is measured by simple electronic circuits... and the result indicated directly on a conventional recorder or indicator. It's simple, positive, accurate!

No chemicals—filaments—catalysts  
cams—complicated mechanical parts!

Send for **Helpful Free Literature** which describes this unique operating principle in detail—explains its many advantages and applications. When writing, outline your particular operations—we'll gladly supply specific information. Ask For Data File 1641-45

**Arnold O. Beckman** INC.

Instruments for Science and Industry

1020 MISSION STREET

SOUTH PASADENA, CALIFORNIA

#### FEATURES OF THE F3

Many Ranges: Full scale ranges of 0-5%, 0-10%, 0-15% O<sub>2</sub> and higher. Accuracy: 1% of full scale. Multi-Ranges: Any instrument may be supplied with two or more ranges.

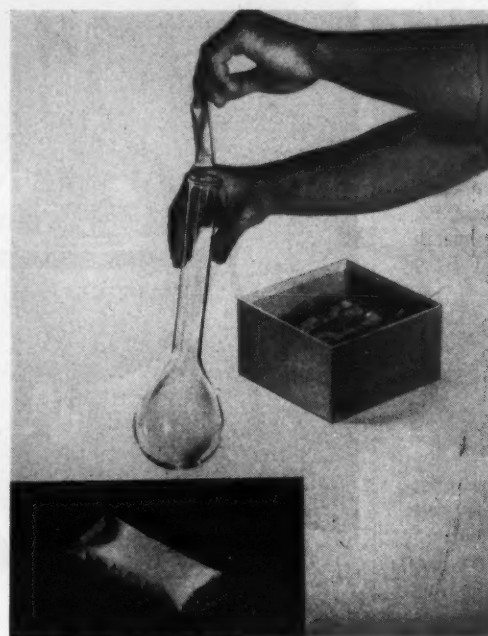
Note: For ranges narrower than 0-5% O<sub>2</sub> ask about the Model G2.

### FOR THE LABORATORY

Saves chemists' time  
in setting up  
Kjeldahls

Kjeldahl nitrogen determinations are speeded up with necessary test chemicals packaged in precise proportions and ready to drop into test flask.

By permitting accurate Kjeldahl tests to be run in less time, powder packages bring costs into comparable range with conventional methods. Chemists need not stock, store, weigh and mix their own test chemicals. Safety is increased too since some of the



Pre-packaged reagent "shot" (inset) is dropped into Kjeldahl flask, speeding up nitrogen determinations with these necessary chemicals

materials needed are toxic. Formulas packaged conform to AOAC standards. Package is polyethylene—inert and having no effect on accuracy of tests. Experiments tend to indicate that polyethylene package also has a measurable effect in reducing foaming in tests.

Made up in large quantities, chemicals for the packages are precision weighed and blended. Every batch is analyzed for uniformity by a research laboratory. Three standard formulas are put up: Kjeldahl, Gunning or Kjeldahl-Wilfarth-Gunning. Special formulas can also be produced on request.

(Samples and complete information are available from the manufacturer—Laboratory Reagents, Incorporated, Department CP, 3030 Main Street, Kansas City, Missouri... or for more information reader may simply check CP 6423 on convenient Reader Service slip which is located opposite last page.)

PRECISION  
makes

the complete line  
in Research  
Laboratory  
Equipment

Precision Scientific Company manufactures a COMPLETE SELECTION of more than 1500 items for use in research laboratories. Quality control and high manufacturing standards at our factory assure you of top performance on any item stamped with the "Precision" name. Always specify Precision when you order items like these:

#### Freas Ovens

Gravity or mechanical convection, floor, table or wall mounting types. Hazard-safe, explosion-proof and vacuum models. Also incubators, sterilizers, conditioning and annealing ovens and humidity cabinets.



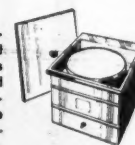
#### Petroleum Testing Apparatus

All types of equipment for the petroleum laboratory. Unique Front-View Distillation Units shown promote accuracy and easier use by centralizing all controls and reading instruments in front. More compact, space-saving design.



#### Metallurgical Hand Polisher

Ideal for small laboratories or for standardized hand polishing procedures in larger labs. Enclosed drive mechanism and lifetime sealed motor assure long, dependable operation. Exceptionally quiet.



#### "Time-It" Electrical Stop Watch

Large, legible indicating counter easier to read than conventional watches. Readings to 1/10 second! Can be re-set to zero from any reading or successive readings can be totaled.



Write for free Bulletins on any of the above equipment.

**Precision Scientific Company**

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When inquiring check CP 6424  
opposite last page

CHEMICAL PROCESSING

When inquiring check CP 6422 opposite last page



all the  
features  
you need  
for fast,  
safe  
drying...



## yet **PRECISION** *Theleo* VACUUM OVENS COST LESS TO OWN AND OPERATE

Quality and performance don't necessarily carry a big price tag. A good example of this is Precision-Thelco Vacuum Ovens. They bring all of the advantages of vacuum drying to research laboratories—are built to give

long service without expensive heater replacements or other repairs, yet are moderately priced. Compare the features below with any other vacuum oven and you'll see why Precision-Thelco is the best buy for the money.

**Wide Area Heater**—Operates at black heat, not incandescence, for greater safety and longer life. Uniformly heats all parts of oven.

**Accurate Hydraulic Thermostat**—Automatically maintains constant temperature from 5° above room temperature to 125°C. May be easily re-set. Thermometer inside oven provides check.

**½" Thick Pyrex Window**—Allows complete visibility of all parts of oven while in operation. Permits observing samples and thermometer without opening door.

**Polyacrylic Gasketed Door**—Makes air-tight seal when vacuum is applied. Stays soft and supple even at extreme temperatures. For easier loading, door stays up when completely raised.

**Rectangular Shape**—Gives maximum operating capacity with most efficient use of lab space. Fully insulated with glass wool (won't deteriorate or absorb moisture, odors). Vacuum gage mounted on top for easy reading.

**Attractive Finish**—"Silver-Tone" Hammerloid—a tough, baked-on enamel—harmonizes with other laboratory equipment. Gives your lab a modern appearance.

**Twice as Fast as Drying at Atmospheric Pressure**

**Minimum Oxidation of the Sample**

**No Scorching or Charring—Even at Fast Drying Rates**

**Safer—Flammable Vapors Drawn Off**

**Also Can Be Used for Desiccation of Foods, or Conditioning**

Be sure you get these features by specifying Precision-Thelco Vacuum Ovens. Write for details in Catalog No. 331A

**Precision Scientific Company**

3747 WEST CORTLAND STREET • CHICAGO 47

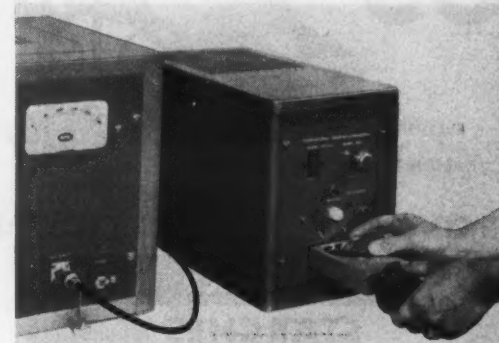
When inquiring check CP 6425 opposite last page

FOR THE LABORATORY

**Unit counts alpha and beta radiation in precipitates, evaporated salts, and other samples...**

input sensitivity adjustable from 0.0005 to 0.0025v; factory set at 0.001v

**Uses:** Converts any scaler with high voltage range of 600 to 2000v to reliable proportional counter. Enables scaler to count alphas and both hard and soft betas. Unit counts samples such as



Counter converter has built-in low voltage power supply

precipitates, evaporated salts, compressed pellets, ashed and filtered samples.

**Features:** Decontamination, including disassembly and assembly time, requires less than ten minutes. Input sensitivity (set at 0.001v) is adjustable from 0.0005v to 0.0025v.

**Description:** Unit measures 8¼" wide x 16½" deep x 11½" high and weighs approximately 30 lb. Only connections needed are 1) to 115v AC line, 2) to cylinder of correct type of counting gas, and 3) to G-M input of scaler.

(Mod PCC-14 proportional counter converter is a product of Nuclear Measurements Corp., Dept. CP, 2460 N. Arlington Ave., Indianapolis 18, Ind. ... or for more information about this product reader may simply check CP 6426 on convenient Reader Service slip which is located opposite last page.)

**For the latest in laboratory equipment...**

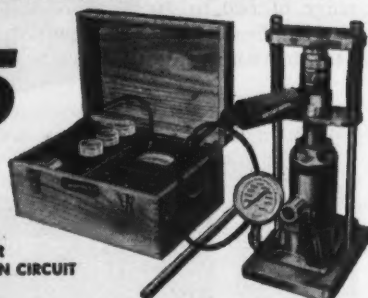
look in the alphabetized, itemized Product Directory beginning on page 237. All articles presented in this issue of CHEMICAL PROCESSING are listed there.

# A 1 MINUTE MOISTURE CHECK

INSURES QUALITY OF PRODUCT  
WHEN YOU USE THE  
**NEW MOISTURE REGISTER**

## G5

EXCLUSIVE  
R. F. POWER  
ABSORPTION CIRCUIT



**PROVED IN THE FIELD ON**

**SUGARS**

**STARCHES**

**FLOURS**

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**DRIED EGGS**

**FEEDS**

**POWDERED CHEMICALS**

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**BAKING MIXES**

**MEALS**

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Send Coupon TODAY!

**ELECTRONIC  
MOISTURE REGISTER**

Moisture Register  
testing equipment  
is the standard in moisture  
testing for all industries.

1510 W. Chestnut St., Alhambra, California, Dept. CP

Please send me complete information on MODEL G5

MOISTURE REGISTER. I want to test \_\_\_\_\_ (MATERIAL)

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_ ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

When inquiring check CP 6427 opposite last page

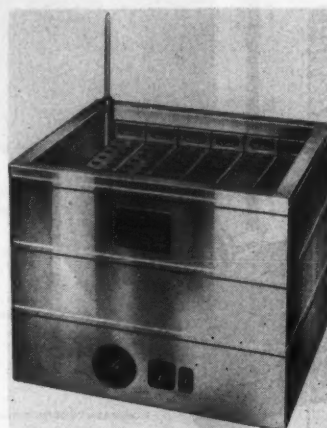
## LABORATORY

Adjustable shelf makes  
laboratory bath  
more versatile . . .

all-purpose bath has higher  
temperature range, too

Uses: For utility and serologi-  
cal laboratory baths.

Features: Design incorporates  
corrosion-resistant stainless steel  
shelf with removable legs to  
quickly change depth of bath



Lab bath features adjustable tray

from seven inches for general lab  
use to five inches for test tube  
racks in serological work.

Description: Bath operates in  
range from room temp to 100°F  
with accuracy of  $\pm 0.5\%$ ; with  
cover, accuracy is  $\pm 0.3\%$ . Sensi-  
tive thermostat permits resetting to  
exact temps.

(Constant-temp bath is product of  
Precision Scientific Co., Dept. CP,  
3737 W. Cortland St., Chicago  
47, Ill. . . or for more informa-  
tion, check CP 6428 on handy  
form opposite last page.)



"How's that dust-free carbon  
black experiment of yours working  
out, C.B.?"

# See What's Cooking

IN  
**ROCKWELL OVENS**

Gas-fired oven with slotted door for convenient removal of individual trays of product.

Cabinet type, electric recirculating oven with pyrex glass windows for inspection of work during heating and dry ice cooling.

These are but two of the Rockwell line of standard and special ovens for evaporating, drying or baking process materials to 1000°F., with close control of temperature uniformity.

Made of steel or any special metal, insulated panel construction in sizes from 18" x 18" x 18" to any desired size, either batch or continuous or conveyor oven types; electric, gas, oil or steam heated.

Write for Catalog.



**W. S. ROCKWELL COMPANY**

FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY

2205 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

When inquiring check CP 6429 opposite last page

for rapid and precise measurement  
of pressure and vacuum

ABSOLUTE AND DIFFERENTIAL

# Manometers

for industry • pilot plant and laboratory

To cover the full range of pressure and vacuum measurements in the laboratory, pilot plant and industry, Emil Greiner offers its new Absolute and Differential Manometers. With these Manometers you can achieve either absolute or differential manometric measurements with unprecedented simplicity and high precision. Only a single reading is required to obtain a precise measurement automatically corrected for ambient temperature and reduced to a height of mercury at 0° C.

G10705A Range: 0-200 mm. (Glass only) ea. 29.50  
G10705 Range: 0-200 mm. (with Stand) ea. 39.50  
G10708 Range: 0-800 mm. (Glass only) ea. 39.50  
G10709 Range: 0-800 mm. (with Stand) ea. 79.50

The Emil Greiner Co., Dept. 224  
20-26 N. Moore Street, New York 13, N. Y.  
Please send me Instant Pressure & Vacuum Control Manual.

NAME \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

For More Complete Information Write For  
"Constant Pressure and Vacuum Control Manual"

**The EMIL GREINER Co.**  
20-26 N. MOORE STREET DEPT. 224 N. Y. 13, N. Y.

When inquiring check CP 6430 opposite last page

CHEMICAL PROCESSING

For l  
scale  
uses

Uses:  
requir

Featu  
chine

Descr  
mixer  
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Stand  
hand-  
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(Mod  
Co.,  
N. Y.

Catal  
of lab

Illu  
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194



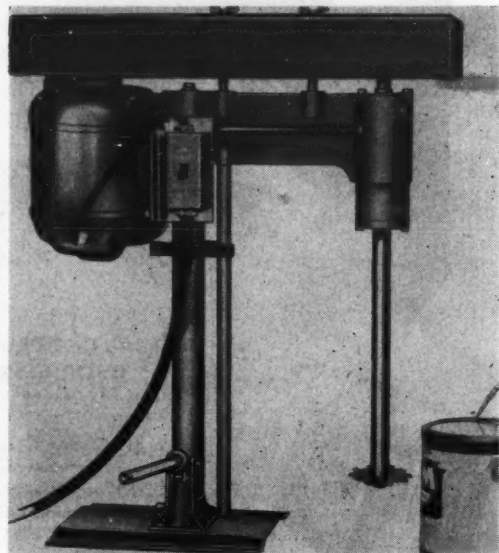
**For heaviest of lab mixing  
scaled down model  
uses 1 hp**

**Uses:** High-speed mixer is used to cut time required for dissolving and dispersing materials.

**Features:** Standing only 30 inches high, machine is scaled down from larger size units.

**Description:** Laboratory version of high-speed mixer and dissolver can be used for small scale production work as well as laboratory work.

Standing 30 inches high, mixer is equipped with a hand-operated hydraulic lifting device which can raise it to 44 inches. Base is 10" x 12". Machine



Laboratory model stands 30 inches high

occupies an area of 10 x 24". Three impellers are sized at 3, 3 1/2, and 4 inches in diameter. These are supplied with machine as standard equipment. While results are reproducible in larger units for production work, machine can be used as a production unit itself for batches up to 5 gallons in solution or dispersion situations.

(Model 1-VT Mixer is a development of Cowles Co., Inc., Dept. CP, 113 Trackside, Cayuga 1, N. Y. Check CP 6431 opposite last page.)

**Catalogs special line  
of lab glassware**

Illustrated catalog lists more than 2600 pieces of special laboratory apparatus.

Cat CA-1 is available on letterhead request to Special Apparatus Section, Laboratory and Pharmaceutical Sales Dept., Corning Glass Works, 1949 Crystal St., Corning, N. Y.

# NEW TYPE STURTEVANT AIR SEPARATOR

*Recovers  
Fines  
in Micron  
Ranges*

Now the famous Sturtevant Whirlwind Air Separator, so widely used throughout industry for fast recovery of fines, has been specially designed to "pick-off" classified materials such as pigments, limestone fillers, plastics, oyster shells, etc., in micron sizes.

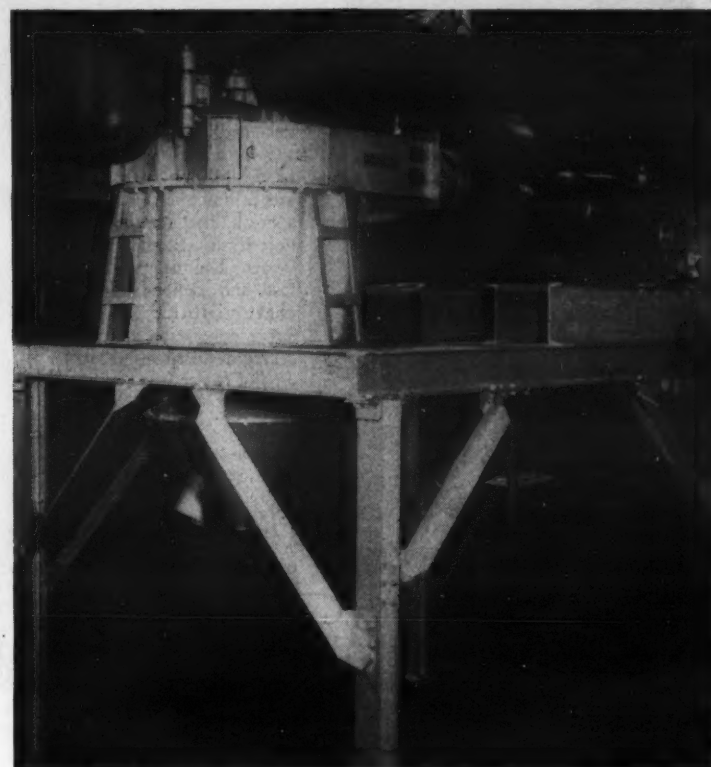
These highly efficient air separators select a continuously uniform product of desired fineness. Used in a closed circuit with grinding mills, they increase production, cut power costs.

Large feed opening, rugged construction, ease of adjustment, low power consumption assure economy of operation and minimum upkeep. Write for further information.

**STURTEVANT  
MILL COMPANY**  
119 CLAYTON STREET  
BOSTON 22, MASS.

Designers and Manufacturers of:

CRUSHERS • GRINDERS • SEPARATORS  
CONVEYORS • MECHANICAL DENS and  
EXCAVATORS • ELEVATORS • MIXERS



## OTHER STURTEVANT EQUIPMENT



### MICRONIZER GRINDING MACHINE

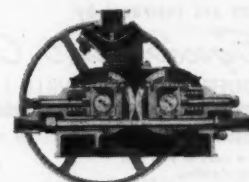
A fluid jet grinding machine, the Sturtevant Micronizer speeds reduction of materials to low micron sizes. These jet mills are especially applicable in fields where a particle size in microns is desired.

Sturtevant Micronizer grinding machines are available in many sizes and capacities.



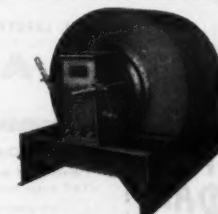
### RING-ROLL MILLS

For medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open door accessibility. Many sizes. No scrapers, plows, pushers, or shields.



### CRUSHING ROLLS

For granulation, coarse or fine, hard or soft materials. Automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8 x 5 to 38 x 20. The standard for abrasives.



### BLENDER

Four-way mixing action assures a thoroughly blended product. Open-door accessibility permits easy cleaning. Available in many mixing capacities for 1/4-ton per hour and up.

When inquiring check CP 6432 opposite last page

**RECORDS  
TWO INDEPENDENT  
VARIABLES FROM  
ANALOG OR DIGITAL  
INPUTS**

**X-Y PLOTTER  
AND RECORDER**



A compact, desk-size unit designed for general purpose graphic recording from analog or digital inputs with standard Librascope converters or special modifications engineered to customer requirements. Unique pen travel, fast and dependable. Full chart visibility allowing curve generation to be observed at all times. Write for detailed catalog information.

Mechanical and electrical analog computers, digital computers, input-output devices and components.

Computers and Controls

**LIBRASCOPE**

A DIVISION OF GENERAL PENDING COMPANY  
LIBRASCOPE, INCORPORATED 1607 FLOWER ST., GLENDALE, CALIF.

When inquiring check CP 6433 opposite last page



**"Doodling"  
A NEW LAB?**

**you need this new  
catalog and planning guide**

180 pages of valuable ideas, layouts, specifications...featuring the most modern laboratory furniture and equipment.

See how Metalab's exclusive sectional design gives you unlimited opportunity for "custom-building" your lab. Find out how you can satisfy your exact needs...without paying custom-made prices. It's the year's most valuable aid to laboratory planning. Don't miss it.



**SECTIONAL LABORATORY FURNITURE AND EQUIPMENT by  
METALAB Equipment Corp.**  
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on your company's letterhead or coupon stating your title and firm's name

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METALAB EQUIPMENT CORP., 230 DUFFY AVE., HICKSVILLE, L. I., N. Y.  
Please send me without charge a copy of your new 180 page manual on laboratory planning.  
☐ I am also interested in your free laboratory engineering and planning service.

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Firm \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_ (Please print)

When inquiring check CP 6434 opposite last page

## LABORATORY

**Synthetic fiber garments  
resist acid or caustic  
solutions . . .**

coats save on laundry, inventory, replacement costs

Large chemical laboratory in the South replaced stock of cotton shirts and trousers with approximately 1400 Dynel laboratory coats in mid-1953. Survey nine months later showed that none of coats had been replaced because of wear and tear. One had been replaced because of heat burn.

Projection of former experience with cotton garments showed that had cotton garments been used over this nine-month period, more than 80 per cent replacement of inventory would have been necessary.

Personnel wore Dynel coats longer because they did not show dirt as readily as cotton and no damage resulted from acid or caustic solutions. Laundry procedure is simplified. Coats are washed and extracted (spun dry) in standard equipment but with extraction time of only two minutes. Garments are removed from washer, tumble-dried and put away in storage closets. Ironing has been eliminated.

(Dynel laboratory coats are products of Chem-Wear Inc., Dept. CP, 1 Boston Post Rd., Darien, Conn. . . or for more information check CP 6435 on handy form opposite last page.)

### Lists complete line of fine wires

Bulletin of four pages gives specifications and characteristics of extruded wires, Wollaston wires, Taylor process wires, resistance wires, metallic ribbon, thin foil, and thermo-element wires.

"Fine Wire" bulletin is issued by Baker & Co., Inc., Dept. CP, 113 Astor St., Newark 5, N. J. When inquiring specify CP 6436 opposite last page.

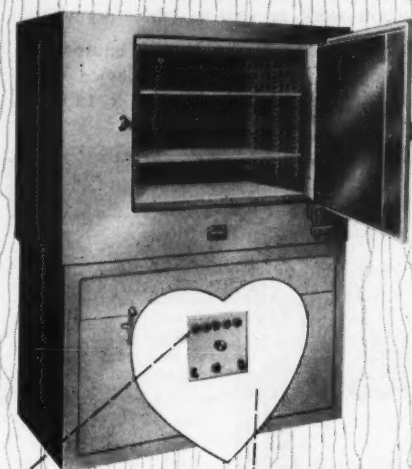
**BLUE M**

**OUTPERFORMS  
ALL OTHER OVENS**

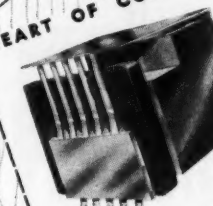
*Guaranteed!*

BLUE M CON-WATE MECHANICAL  
CONVECTION OVENS WITH  
**POWER-O-MATIC**

U. S. and Foreign Patents Pending



**HEART OF CONTROL**



**\*ACTUAL CONTROL  
± 1/2° C. OR LESS**

\*Not to be confused with response sensitivity.

BLUE M's Electric Ovens now use Maximum wattage ONLY on initial run-up. When set temperature is reached, POWER-O-MATIC goes into action and MINIMUM wattage is AUTOMATICALLY modulated in relation to temperature and work load.

**STRAIGHT LINE TEMPERATURE CONTROL  
AUTOMATIC HEAT RECOVERY  
EXTRA "400%" SAFETY FACTOR**

TEMPERATURE RANGE TO 316° C.						
Model No.	W.	I.D. (Inches)	H.	Max. Watts	Voltage 50/60 Cycles A.C.	Complete Price
POM-100	14	14	14	2800	115 Volts	\$545.00
POM-110	20	18	20	4000	230V/1 ph.	649.00
POM-120	25	20	20	4400	230V/1 ph.	759.00
POM-130	38	20	25	5800	230V/1 ph.	975.00

ALSO AVAILABLE IN BENCH AND LARGE INDUSTRIAL MODELS  
WRITE FOR "THE POWER-O-MATIC STORY"

**BLUE M ELECTRIC CO.**  
138 1/2 AND CHATHAM STREET  
BLUE ISLAND, ILLINOIS

When inquiring check CP 6437 opposite last page

CHEMICAL PROCESSING



### Make a simple task of closeup photos for the lab...

frame and flashguard locate subject, show size of field and provide proper light

Many problems of close-up color photography are reduced to a minimum by technical close-up attachment. Kits are well suited for solving photographic problems in industrial and scientific laboratories.

Two basic kits have been put together. One, the Kodak Pony Close-Up Kit, includes framing attachment, supplementary lens and filters and special close-up flashguard. Second kit, the Kodak Technical Close-Up *Outfit* includes both kit and everything else needed for close-up technical photography—Kodak Pony 828 Camera, flash holder, attachments.

Technical kit is designed for novices who need to produce color transparencies of good quality in a



Kit is specially designed for close-ups of technical subjects

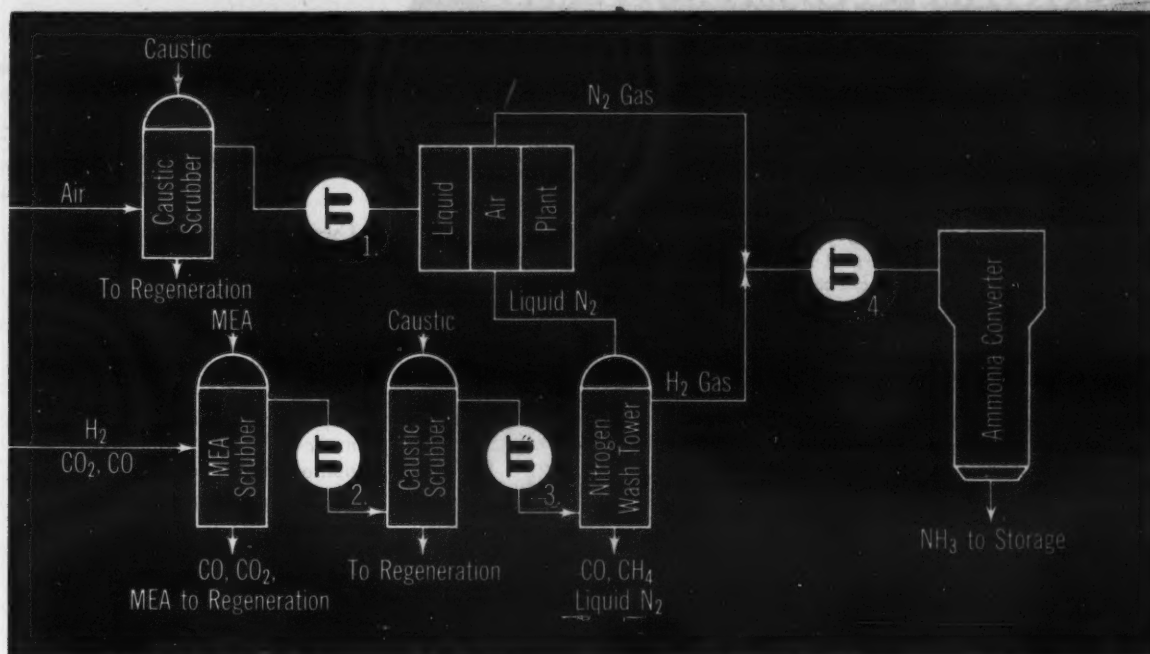
minimum time. Production line people and technicians with no photographic background learn to use it in a matter of minutes.

Mounting plate holds camera rigidly and accurately, positions flash holder so that light is beamed at object framed. Half frame in front of camera accurately defines field of picture coverage (3 x 4 inches at a distance of 6 inches) making it easy for operator to position camera at correct distance. Unit also holds flash holder.

Flashguard over the holder protects subject from heat and shattering of flash bulb. Flashguard also reduces light intensity to 1/10 normal brilliance—correct lighting for extreme close-ups. By positioning flash holder to one side of camera, better light modeling and good roundness and detail are produced. Guide book included with kits suggest proper exposures and settings.

(Close-Up Kits are products of Eastman Kodak Co., Dept. CP, 343 State St., Rochester 4, N. Y. . . . or for more information check CP 6438 on handy form opposite last page.)

### TRUE CONTROL BEGINS WITH ANALYSIS...



## TRI-NON<sup>®</sup> Up Ammonia Plant Efficiency 10%

Would you like to increase ammonia throughput by 10 percent—without plant expansion?

With a Perkin-Elmer TRI-NON Analyzer you can get a continuous measure of the CO<sub>2</sub> level with an accuracy of 1/4-1/2 ppm in the range 0-25 ppm (analyzer #1 in the above flow diagram). The Analyzer determines optimum balance between caustic use and CO<sub>2</sub> removal efficiency. If NH<sub>3</sub> throughput is 250 tons a day and caustic utilization is raised from 70-80 percent or more, this factor alone means a savings of \$4,500-\$6,000 per year.

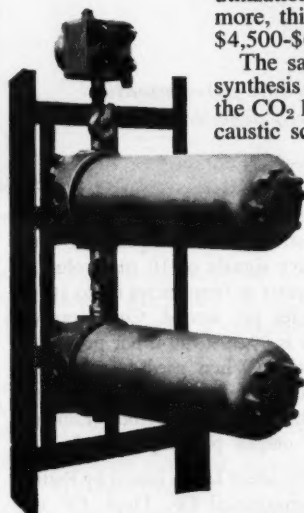
The same analyzer can be used for the synthesis gas stream and can also measure the CO<sub>2</sub> level of the input to the MEA and caustic scrubbers (analyzers #2, #3). At

this level, the equipment is paid off in less than a year of operation *plus* the added insurance against trouble if throughput is raised over design capacity.

The same holds true for the ppm CO level of the final mixture sent to the catalyst (analyzer #4). CO is a catalyst poison even at low levels. But *how* poisonous at *what* level is not well known. With proper control of the CO level, you can save \$8,000-\$10,000 by extending catalyst life. Again an Analyzer pays for itself *plus* the added insurance of increasing throughput with confidence that all is under control.

Let Perkin-Elmer engineers show you how your process can benefit through ANALYTICAL CONTROL—made possible with infrared plant stream analyzers.

\*TM Perkin-Elmer Corp.



Both the TRI-NON and BICHROMATOR Analyzer continuously record the concentration of any desired stream component. Each is sensitized and adjusted to specific plant conditions before shipping.

## PERKIN ELMER — FIRST IN ANALYTICAL CONTROL

When inquiring check CP 6439 opposite last page

THE PERKIN-ELMER CORPORATION  
870 Main Avenue, Norwalk, Conn.

Gentlemen:

☐ Send information on the application of infrared analytical control to the following process problem: .....

☐ Send literature on your infrared plant stream analyzers  
☐ Have a sales engineer call

Name..... Title.....

Company.....

Address.....

## Processing equipment you need

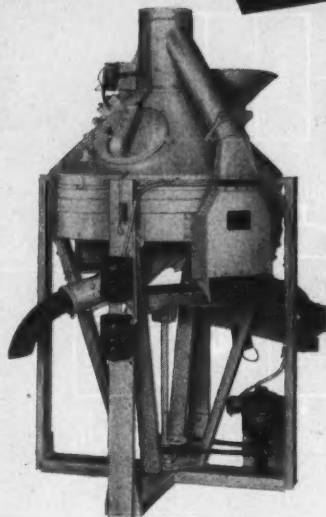
for crushing, grinding, granulating, pulverizing, texturizing, fiberizing, separating, classifying

Many of your processing problems can be readily solved by looking over our literature on the extensive line of Bauer equipment. If you get up to the point where you want specific information, we'll be glad to give you the benefit of our long experience in the processing field.

What's more, we have two research laboratories in which we can make tests and short production runs if we don't already know the answers to your problems.

Our line consists of breakers, crushers, attrition mills, laboratory mills, granulators, texturizers, fiberizers, cleaners, separators, exhausters—all briefly described in Bulletin No. 52.

Ask for the bulletin. No representative will call unless invited.



### THE BAUER BROS. CO.

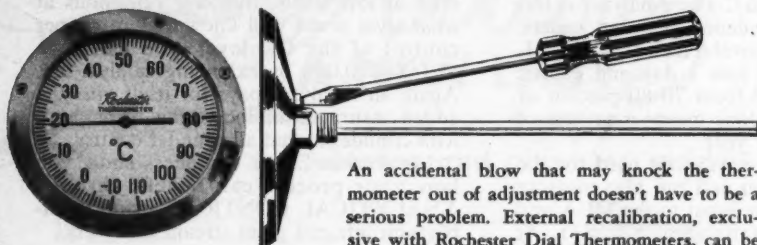
1728 Sheridan Ave. • Springfield, Ohio

Established 1878

Bauer Specific Gravity Separator which cleans or classifies many products and materials by a combination of mechanical and pneumatic force

When inquiring check CP 6440 opposite last page

## EXCLUSIVE! YOU CAN RECALIBRATE THE ROCHESTER DIAL THERMOMETER EXTERNALLY . . .



An accidental blow that may knock the thermometer out of adjustment doesn't have to be a serious problem. External recalibration, exclusive with Rochester Dial Thermometers, can be done easily and quickly. Insert the stainless steel

stem in any liquid of known temperature and adjust the dial with the set screw attachment. It's done easily and quickly, EXTERNALLY, and is completely accurate.

Other plus features include:

All parts, except the crystal, are of corrosion-resistant stainless steel.

Hermetically sealed against moisture and grime.

All readings are completely legible and accurate.

Precision bi-metal helices precalibrated to dial before assembly.

Stem position can be located anywhere around circumference of the dial in the STRAIGHT form thermometers.

Your Rochester representative will be glad to give you additional information, or address your inquiries directly to the Rochester Manufacturing Company, Rochester.

# Rochester

Manufacturing Co., Inc., 86 Rockwood St., Rochester, N.Y.



DIAL THERMOMETERS • GAUGES • AMMETERS

When inquiring check CP 6441 opposite last page

## LABORATORY

Unit supplies up to 20 gph of demineralized water at low cost . . .

lab size ion exchanger may be regenerated in  $\frac{3}{4}$  hr

Uses: Furnishes high purity water for laboratory use.

Features: Unit requires only 15 x 8" of counter space. Regeneration, including rinse-off, is accomplished in less than 45 minutes by turning valves located on face of control panel. Conductivity meter provides continuous indication of effluent purity.

Description: Dual-action design of demineralizer enables two columns to do work of four. Raw water first is filtered through stainless steel screen and then is given two demineralizations — passes through two columns, each of which contain cation and anion resin beds. De-ionized water has less than 1 ppm hardness.

Unit is shipped completely assembled, including regenerated resin charges. Flow control system automatically keeps incoming flow constant at no more than 20 gph.

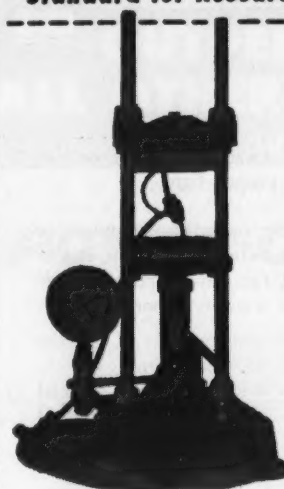
(Mod L-20 demineralizer is a product of Penfield Mfg. Co., Dept. CP, 19 High School Ave., Meriden, Conn. Check CP 6442 on handy form opposite last page.)

### Electronic pulse counter shown, described

Specification sheet of two pages explains design features and applications of electronic totalizer. Instrument counts pulse or sine wave signals of 10 millivolts or greater at frequencies up to 1000 cycles per second. Count capacity is 99,999,999 input pulses or cycles. When used with manufacturer's flow sensing element, totalizer indicates total number of output pulses produced.

Spec sheet L-2 is issued by Potter Aeronautical Co., Dept. CP, 87 Academy St., Newark, N. J. When inquiring specify CP 6443 on form opp. last page.

## Standard for Research and Development



## the CARVER LABORATORY PRESS



... wherever Pressing is required.

Accurately controlled pressures to 20,000 lbs.; 6-inch gauge mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

### FRED S. CARVER INC. HYDRAULIC EQUIPMENT

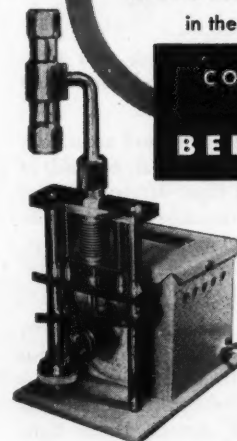
52 RIVER ROAD, SUMMIT, N. J.

When inquiring check CP 6444 opposite last page

### HOW Contamination Is Prevented

in the

### CORSON-CERVENY MICRO-BELLOWS PUMP



All parts of the Corson-Cerveny Micro-Bellows Pump in contact with the liquid being pumped are made of stainless steel and machined so that they fit together without packing, gasket material or any pipe compounds. The use of accurately machined cone-to-taper fittings makes this feature possible.

For this reason, the pump will not contaminate material that it is handling, and is adaptable for many specialized laboratory uses.

For full information about construction, capacity, performance, write for copy of Pump Booklet.

### RESEARCH APPLIANCE COMPANY

143 Cemetery Lane, Pittsburgh 9, Pa.

When inquiring check CP 6445 opposite last page

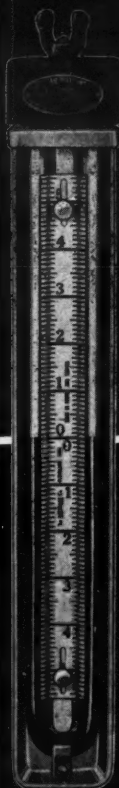
CHEMICAL PROCESSING



UNMATCHED ACCURACY

with  
simplicity  
and  
economy

AT LOWEST COST this Meriam Manometer offers high accuracy. The Meriam B-1103 is the easy-to-use, always dependable form of pressure or flow instrumentation. Pressures to small fractions of an ounce are read directly, accurately... without calibration or instrument adjustment... with complete enduring manometer reliability.



- ★ Rugged cast alloy construction
- ★ Convenient manometer cleanout
- ★ Curved scale for increased readability
- ★ Designed for easy panel mounting

Write for Bulletin C-12.

*Meriam Manometer Instrumentation*  
...for pressures, vacuums,  
flows, liquid levels.

**meriam**  
INSTRUMENT COMPANY  
10920 Madison Ave. • Cleveland 2, Ohio

When inquiring check CP 6446  
opposite last page

FOR THE LABORATORY

**Splash-proof, easily decontaminated,  
portable recorder monitors  
gamma rays...**

available ranges run from tenth of one mil-  
liröntgen to 100 roentgens per hour

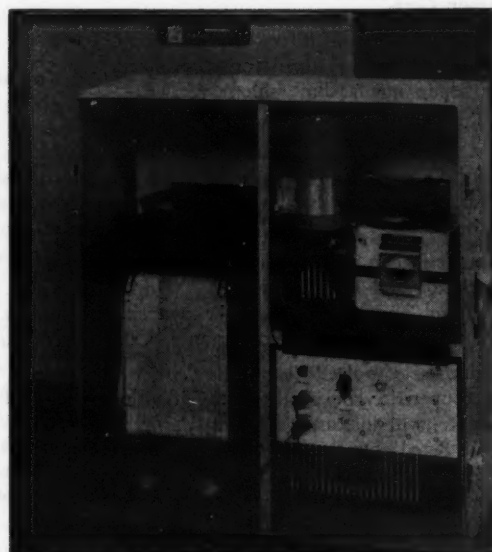
**Uses:** Gamma radiation monitor is portable and  
records radiation level.

**Features:** Recorder is powered by dry cell bat-  
teries — no high voltage batteries are used.

**Description:** Portable gamma radiation of re-  
corder will operate unattended for 200 hour  
periods. Esterline-Angus recorder with spring mo-  
tor is used to make the actual record. Built-in  
alarm warns personnel of abnormal radiation.

Housing of recorder is easily decontaminated  
splash-proof cabinet. Gamma radiation ranges ex-  
tend from 0.1 mr/hr to 100 r/hr. Ranges up to  
500,000 r/hr are available.

Design uses a unique ionization chamber which  
is rugged and does not require high voltage bat-



Only low voltage batteries used to supply power

teries, vibrator, or rectifier power supplies with  
high value resistors. Battery life is in excess of  
200 hours even when recording is on a continuous  
basis.

(Further information on the Model PRAM-5  
Gamma Radiation Recorder is contained in manu-  
facturer's Data File 531. Recorder is made by  
Jordan Electronic Manufacturing Company, Incorpo-  
rated, Department CP, 119 East Union Street, Pas-  
adena 1, California... or for more information  
concerning manufacturer's product reader may simply  
check CP 6447 on handy form which is located  
opposite last page.)

## Let's talk "SPECIAL SIZES"

The size and depth of sinks for laboratory and industrial use should  
be determined by the job they have to do — and not by available  
standard sizes!

With Alberene Stone sinks you can specify any size and depth —  
without paying a premium.

And with Alberene Stone you get — the natural silicate stone with  
the surface that goes all the way thru. Its all-silicate mineral  
components resist chemical attack. Low absorbency makes it essentially  
nonstaining. Discolorations can be removed by scouring or honing  
without harm to the surface.

For information and technical assistance, address: Alberene Stone  
Corporation, 419 Fourth Avenue, New York 16, N. Y.

# ALBERENE STONE

**provides LOW ABSORBENCY protection**

When inquiring check CP 6448 opposite last page



## Step <sup>up</sup> your processing

...with these **FLINTKOTE** products

Today, in volume bonding, laminating, impregnating or similar operations, lower costs are often possible with bulk supplied Flintkote Industrial Adhesives...

### Rubber and Resin Latex Compounds

Great versatility in various formulations of rubber and resin bases with papers and cloth materials. For adhering, flexibilizing, binding.

### Reclaim Rubber Dispersions

Several high test, low cost, not flammable water base adhesives offering wide range in viscosity, open and setting times. You can also use them to extend higher cost, new rubber latices for manufacturing economy.

### Asphaltic Compounds

Emulsions and cutbacks for adhering, saturating or sizing many fibrous products: felts, insulation, fabrics,

paper. You can obtain internal or external water resistance. Also asphalts compounded with rubber and asphalts for extending latices.

### Rubber-Resin Solvent Cements

Formulations for multi-purpose bonding of rubber, metal, wood, plastics, leather, glass, fabrics to themselves or one another. Designed for various application methods and systems.

Let's discuss the possibilities of these adhesives for your processing problems, or ask for technical data sheets. Our 50 years specialized experience is at your service.

### THE FLINTKOTE COMPANY

Industrial Products Division, 30 Rockefeller Plaza, New York 20, N. Y.

Boston • Chicago Heights • Detroit • Los Angeles • New Orleans • Philadelphia

In Toronto, Ontario: The Flintkote Company of Canada, Ltd.

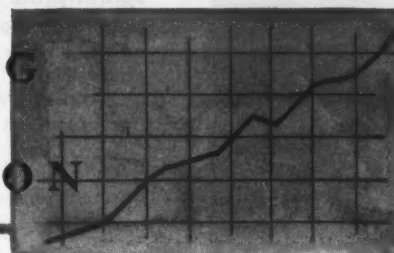
In London, England: Industrial Asphalts Company, Ltd.



**FLINTKOTE** *Products for Industry*

When inquiring check CP 6449 opposite last page

## EXPANDING CHEMICAL PRODUCTION



### UCC's latest polyethylene plant now in production

Full-scale operation for the production of polyethylene, ethylene oxide, and butadiene at its new Seadrift, Texas, plant, has been announced by Carbide and Carbon Chemicals Co., a division of Union Carbide and Carbon Corp.

The plant, UCC's fifth for the production of ethylene oxide and third for polyethylene, has begun regular bulk shipments.

Ethylene oxide is synthesized from ethylene by a direct oxidation process pioneered by Union Carbide in 1937. It is the major raw material for more than 70 chemicals basic to the chemical processing industry.

Other ethylene oxide plants are at South Charleston and Institute, W. Va., Whiting, Ind., and Texas City, Texas, with a sixth now under construction at Torrance, Calif.

Production of polyethylene at Seadrift, with the cooperation of another UCC division, Bakelite, will increase the industry's output 25%. Rated annual capacity of the plant is 60,000,000 pounds of the versatile plastic—more than the entire industry produced in 1950.

Other polyethylene plants are at South Charleston and Texas City. The Torrance, Calif., plant will also produce polyethylene.

### Automatic equipment boosts surfactant production

Hart Products Corp. has completed a \$100,000 expansion program at its Jersey City, N.J., plant with the installation of fully automatic all-stainless pressure equipment for manufacture of nonionic surface active agents, and other ethylene oxide condensates.

Latest unit has modern safety and quality control devices. Company will supplement its present line with nonionic detergents, wetting agents, and emulsifiers to meet specific requirements. Products are used in paper, cosmetic, leather, textile, and industrial trades.

### Koppers Co. tells expansion plans for 1955

More than \$20 million will be spent on its new plants and equipment and improvement of existing facilities, according to a year-end report by Koppers Co., Incorporated.

Large portions of the allotted 20-million-dollar budget will be used to complete company's large polyethylene plant at Port Arthur, Texas, and a new Salem, Va., plant for the Wood Preserving Division. Polyethylene plant is expected to be in operation late this month; the Salem addition is scheduled to start production this fall.

### Natchez plant will make $NH_3$ , $C_2H_4$ , vinyl derivatives

A 20-million-dollar investment for the Standard Ore and Alloy Corporation will begin soon with plans for construction of a plant to produce ammonia, vinyl derivatives, and acetylene. Simpson Coal and Chemical Corp., subsidiary of Standard Ore, announced the site would be Natchez, Miss.

Plant will have facilities to produce 30,000 tons/year acetylene, and 60,000 tons/year ammonia.



**News about chemical materials in the US —  
plant construction, increased production . . .  
on stream now or planned for future**

**National Starch constructing  
PVA polymer plant**

Construction has begun on National Starch Products' polyvinyl acetate polymer plant at Meredosia, Ill., with completion on a 120-acre site scheduled for this summer. Blaw-Knox Co., Pittsburgh, has been contracted to erect the plant. Installation will produce vinyl adhesives and is designed to complement capacity of a similar unit at Plainfield, N. J.

Adhesives have found wide use in labeling, sealing, and coating operations.

Other long-range plans, calling for an expenditure of \$3,500,000, include new and modernized equipment at the Plainfield, Chicago, and San Francisco plants, expansion of the Indianapolis plant, and doubling the Alexander Research Laboratories.

**AEC to expand feed materials  
plants at two sites**

Atomic Energy Commission will expand facilities of feed materials production and processing plants at St. Louis and Fernald, Ohio. St. Louis project, under joint construction contract, will concentrate on expansion of AEC facilities at the Mallinckrodt Chemical Works, at an estimated total cost of \$39,800,000. Feed materials production center at Fernald will be improved at an estimated cost of \$20,100,000.

**Mercaptan synthesis plant  
on stream at Texas City**

Multimillion-pound-capacity mercaptan synthesis plant, largest of its type in the world, has been completed for the Pan American Refining Corp., subsidiary of the American Oil Co., at Texas City, Texas.

The plant, which represents a new venture for Pan American in the petrochemicals field, will produce five million pounds of methyl mercaptan a year. High-purity (99%) methyl mercaptan will be plant's principal product, but unit is designed to produce other mercaptans, such as ethyl and propyl. Dimethyl and diethyl sulfides will also be available in quantity as markets develop.

Chief use of methyl mercaptan will be in the synthesis of methionine.

**Spencer opens polyethylene plant  
at Orange, Texas**

Test runs conducted recently marked the opening of Spencer Chemical Company's new polyethylene plant at Orange, Texas. Producing section is currently running at 80% of designed capacity.

Automatic control of the section was effected in just 15 minutes after initial startup, and operation has been continuous since.

**Girdler catalyst plant  
nears completion**

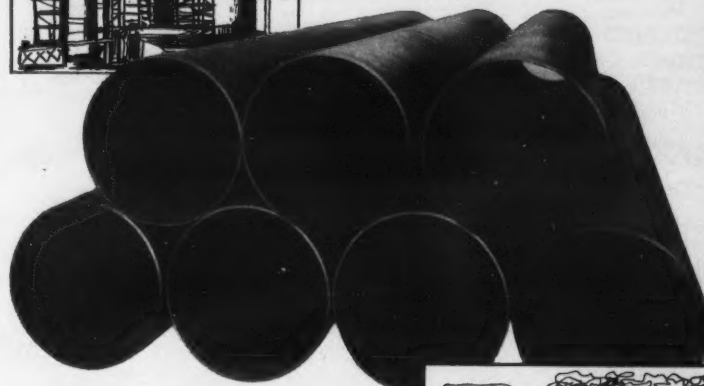
A \$1,000,000 plant for the production of catalysts is nearing completion at the Girdler Company's Louisville, Ky., site. Girdler is a division of National Cylinder Gas Co.

The plant, built in conjunction with company's consolidation program, was finished last October, and production is being maintained while equipment from old plant is being installed in the new. Transfer of all equipment is expected to be completed this month.

Catalysts are used in hydrocarbon reforming, carbon monoxide conversion, hydrogenation, desulfurization, and oxygen removal.

# See POSEY

## For Large O. D. Alloy Steel PIPE



**For Specialized Uses  
In Oil Refineries  
And Power Stations**

You can depend on Posey to meet your requirements in large O. D. alloy steel pipe . . . and you can depend on Posey to turn out your job economically and on time.

- Posey Alloy Steel Pipe is fabricated in accordance with ASTM specifications, Class A 155-52 aT.
- Posey specializes in large O. D. Pipe and Pileings of low and high alloy steel, alloy clad steel, carbon steel, and wrought iron.

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PRESSURE VESSELS • DIGESTERS  
CARBON STEEL AND ALLOY STEEL PLATE FABRICATION**

**POSEY IRON WORKS, INC.**

*Steel Plate Division*  
LANCASTER, PA.

New York Office: Graybar Bldg

Established Since 1910

When inquiring check CP 6450 opposite last page

**Ducon**

*preferred*



**... for Dust Collection in  
Anaconda's Yerington Mine Operations**

Ducon Cyclone Collectors are used for dust control on the various operations at Anaconda's Yerington, Nevada Copper Leaching Plant. Crushing and related operations are the starting point in the preparation of many raw materials for subsequent use, whether it be for metallurgical, chemicals or construction. From exploratory drilling through the various processes to the end product, Ducon Dust Control Equipment performs the vital service of product recovery and dust control in the many material processing operations.

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the name in dust control  
**Ducon**  
THE Ducon COMPANY

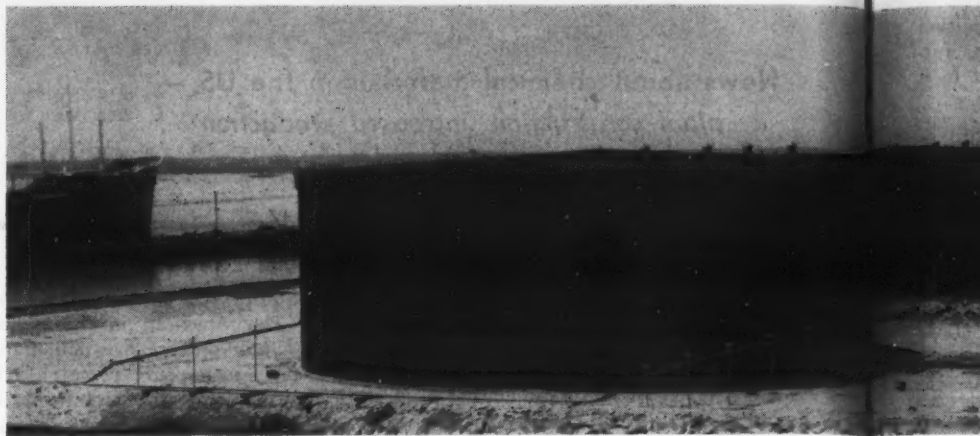
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Designers and Manufacturers of Dust Control Equipment Exclusively

CYCLONES • CENTRIFUGAL WASH COLLECTORS • TUBULAR CLOTH FILTERS • DUST VALVES

When inquiring check CP 6451 opposite last page

**engineering and  
maintenance**



Heavy fuel oil is unloaded from tanker to 150,000 bbl storage tanks, which are insulated with asphaltic coating

**Cost of maintaining fuel oil at 175°F cut,  
as asphaltic coating containing cork —**

## ***insulates and protects storage tanks***

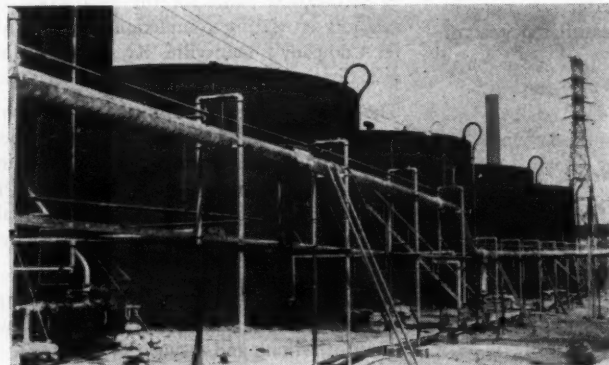
**Saves sufficient steam to pay for itself  
in 2 to 2½ years, evening out peak loads**

**Problem:** Excessive steam was required to heat about 60 tanks used for storage of residual fuel oil at a large refinery on the East Coast. To facilitate pumping, the heavy oil is maintained at 150-175°F by means of steam coils in

bottom of tanks. Need for insulation on tanks was indicated to reduce heat losses and even out peak steam loads.

**Solution:** Estimates for project using conventional insulation included cost for painting over insulation, as well as for emptying tanks and necessary welding before application. This was in addition to the cost of material and application.

Calculations showed that an asphaltic in-



Photograph of 10,000 bbl tanks illustrates protection from corrosion provided by asphaltic coating

insulating  
applied  
insulation  
sary and  
prior to

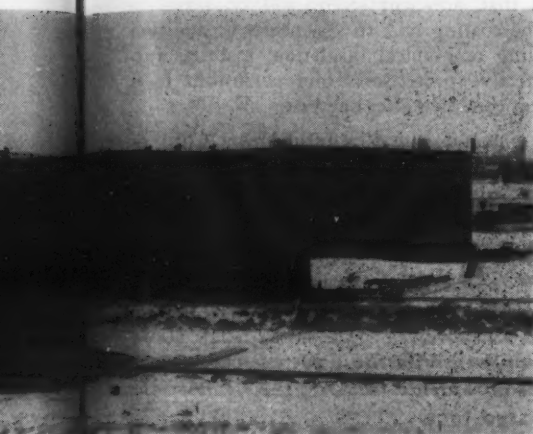
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**Results:**  
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insulating coating, known as Insul-Mastic, could be applied for about half the cost of conventional insulation. No additional painting would be necessary and plant would not have to empty tanks prior to application of material.

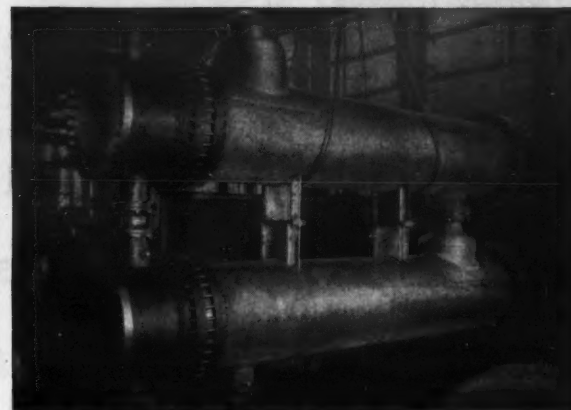
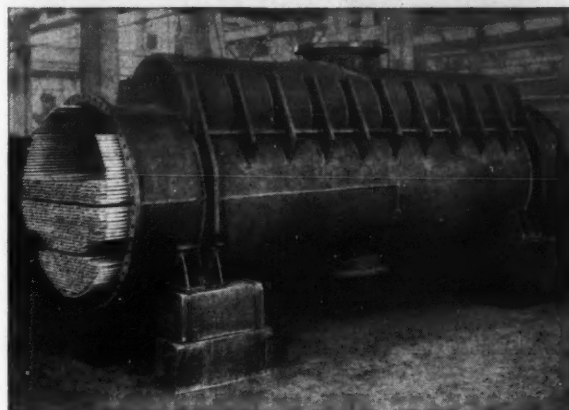
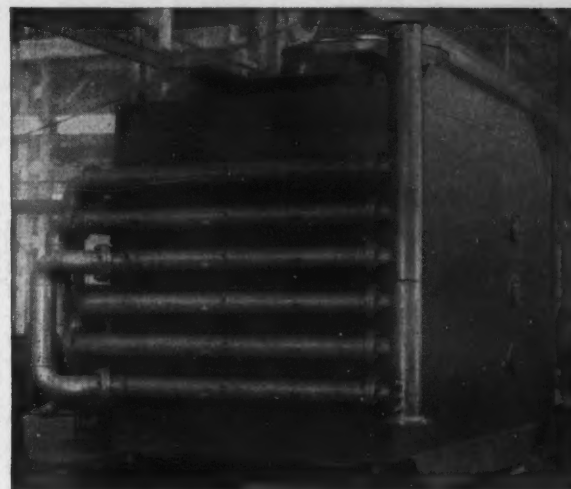
Among the different types of insulation considered, the dollar cost was about proportional to the insulating value obtained in each case. However, for this project, it was decided that the asphaltic coating at the lower cost would meet requirements.

Storage tanks were insulated with No. 553 Type "D" Insul-Mastic coating during the latter part of 1953. This is an asphaltic material containing a high percentage of granulated cork. Steel surface was sandblasted and one coat of the asphaltic coating, calculated to give  $\frac{1}{4}$ " dry thickness, was sprayed on. This application was made immediately after sandblasting to prevent rust formation on surface.

**Results:** Peak steam loads have been evened out since the asphaltic coating was applied. It is

*(Continued on next page)*

This row of 800 bbl tanks is also insulated with asphaltic coating, which contains a high percentage of granulated cork



## Even the most specialized exchangers and condensers get a head start here!

On the assembly floors of the Kewanee-Ross plants in Buffalo, N. Y. and Kewanee, Ill., are Ross Exchangers and Surface Condensers of numerous designs.

Some are completely standardized . . . some partly standardized . . . others completely special.

But *all* have a big point in common: *They were off to a head start from the time Ross engineers were first consulted.*

Unsurpassed experience with a tremendous variety of both standard and special designs is usually able to produce successful precedents for most requirements. Often, for even the most specialized needs, standard

components in a wide range of working pressures can be utilized at tremendous savings in cost and time . . . flanges, shell and floating head covers, tube sheets, tube layouts, shells, channels, for example. And from the all-important standpoint of fabricating facilities, the two, large, modern plants of Kewanee-Ross are equipped with the latest machines and tools to do the job better and faster.

Before you form your own opinion on how complex or specialized your condenser or exchanger has to be to meet your requirements, consult with a Kewanee-Ross engineering representative. A short talk can well result in many shortcuts to a satisfactory solution.



**KEWANEE-ROSS CORPORATION**

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

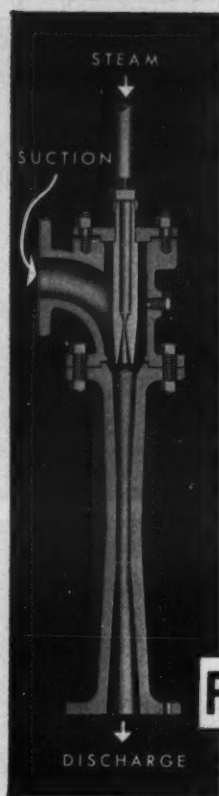
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When inquiring check CP 6452 opposite last page



## Ingersoll-Rand EJECTORS

are "misers" with  
your steam

Ingersoll-Rand steam jet ejectors are the *simplest* and most economical means of producing many types of vacuum. Their single, one-piece nozzle eliminates any possibility of internal leakage and wasted steam.

Whether your application calls for a 1" or 66" suction I-R ejector, you can be sure you're getting all the vacuum that your steam can produce. It will pay you to check the I-R points of superiority before making your next ejector installation. Write us for Bulletin 9013-A.

4-130



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PUMPS • COMPRESSORS • TURBO-BLOWERS  
AIR & ELECTRIC TOOLS • VACUUM EQUIPMENT  
GAS & DIESEL ENGINES

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## Get low cost, trouble-free general purpose valves . . .

**ZERO to 150 p.s.i.  
Temperatures to 250°F.**



### Atkomatic Semi-Direct Lift Solenoid Valve

• Packless, full-ported valves for general purpose industrial use. Operate from 150 p.s.i. down to 0 p.s.i.—temperature to 250°F. Low current consumption. Instantaneous, stick-free operation. Parabolic shaped

disc screw prevents water hammer effect, assures minimum drop in pressure through valve.

Simple yet rugged construction of cast bronze is ideal for air, gas, freon, methyl chloride, water, oil, low pressure steam or other media not harmful to bronze. Write today for complete information and prices. Specify CP1-104

**Atkomatic VALVE COMPANY**  
545 ABBOTT STREET • INDIANAPOLIS 25, INDIANA

When inquiring check CP 6454 opposite last page

## ENGINEERING & MAINTENANCE

(Continued from preceding page)

estimated that sufficient steam will be saved to pay for the coating in 2 to 2½ years. In addition to providing economical insulation, material furnishes effective protection from corrosion. It is in excellent condition after one year.

(Coating is manufactured by Insul-Mastic Corp. of America, Dept. CP, 1141 Oliver Bldg., Pittsburgh 22, Pa. . . or for more information reader may simply check CP 6456 on handy form opposite last page.)

**No contamination inside,  
no corrosion outside  
with glassed tank . . .**

developed for storage of neutral products where non-adhesion, easy cleaning count

**Uses:** Storage of neutral products, such as paint, pigment, wax, which could be stored in plain steel except for possibility of product contamination or difficulty of cleaning plain steel.

**Features:** Storage tanks are built of carbon steel glassed both inside and out. Practically nothing sticks to glass surface and tank can usually be thoroughly cleaned simply by hosing it down. Glass cannot contaminate product. Outside of tank won't rust and will never require painting.

**Description:** Vertical glassed steel storage tank, called Utilitank, is available in capacities from 1000 to 5000 gallons. Its simple, low-cost design was developed for storage only. Tank has an inlet in center of top head, an outlet at bottom of straight side, and two openings for connecting a gage glass. Man-hole in top head, which provides access to tank for cleaning, is fitted with loose stainless steel cover.

Leg supports have been eliminated. Additional openings can be provided in straight side or top head. Tank is not suitable for internal pressure or vacuum.

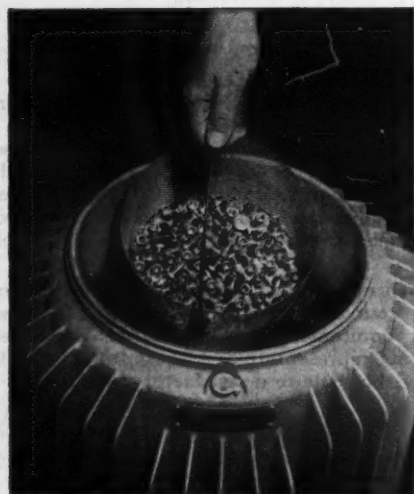
(Glassed steel storage tank is a product of The Pfaunder Co., Dept. CP, 1000 West Ave., Rochester 3, N. Y. . . or for more information check CP 6457 on the convenient Reader Service slip which is located opposite last page.)



Outside of tank won't rust,  
will never require painting

## Bendix ULTRASONIC CLEANERS

**JOB-PROVED in application!  
COST-PROVED in production!**



Does your present process provide a *complete, low-cost* method of cleaning complex parts? Or are you losing thousands of dollars a year by using cleaning methods that are not 100% effective and . . . *in addition* . . . require the use of costly solvents?

Bendix Ultrasonic Cleaners will provide the answer. They do the job *faster and better* . . . because ultrasonic energy creates millions of minute implosions that scrub the parts. They clean at *lower cost* . . . because,

in most cases, the only solution required is a water-detergent mixture.

Bendix Ultrasonic Cleaners are available in various sizes for cleaning metals, glass, rubber, plastics, ceramics, etc., *with a proved efficiency not possible by any other known method.*

Find out what your cleaning process is costing you and what we can do to help you. Our Customers' Service Laboratory will be glad to show you how really clean a part can be. Write today.

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When inquiring check CP 6455 opposite last page



**Shear strengths over 3000 psi  
obtained with adhesive  
on most materials . . .**

will cure in 24 hr at room temp, or cure time may be speeded by heating

**Uses:** Bonding a wide variety of rigid materials including glass, all metals, concrete, ceramics, wood, and almost all plastics except for polyethylene, Teflon, or Kel-F.

**Features:** Shear and tensile strengths greater than 3000 psi can be obtained with most materials bonded. Excellent adhesion is developed within 24 hr at 77°F. Curing time may be shortened to one hour by heating articles being joined to 190°F. Material contains no volatile solvents and has very low shrinkage on setting. Because of this property, it can be used to advantage as a wood filler or potting compound.

**Description:** General purpose adhesive, called Amphesive 801, is based on epoxy resins. Material consists of resin and catalysts which are mixed in proper proportions at time of use. At temperatures of 70-80°F, compounded adhesive has a pot life of 30-45 min and must be used within this time period. This adhesive is not resistant to strong acids or alkalis. It is toxic and readily absorbed through the skin. If any is spilled on body, it should be washed off immediately with cold water.

(General purpose adhesive is a product of The Atlas Mineral Products Company, Dept. CP, 26 Walnut St., Mertztown, Pa. . . or for more information check CP 6458 on handy form opposite last page.)

**Taper design takes wear,  
clearances not affected  
on gear pump**

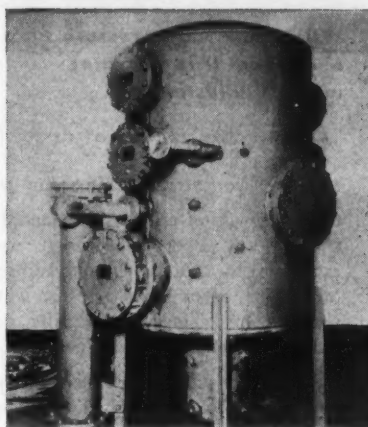
**Uses:** Pumping liquids containing abrasives or other foreign matter.

**Features:** By reason of taper design of unit, any wear which occurs is automatically taken up without effect on clearances.

Impellor gears, though of straight spur type, are ground with a 2° taper after hardening to match tapered recess in housing. As wear occurs, spring tension on floating back-up plate acts to force gears into taper bore of case to maintain close fit and constant high vacuum.

**Description:** Tapered gear pump, designated Model U-3, has a normal capacity of 8 gpm. It will deliver up to 18 gpm at 1000 rpm shaft speed, at pressures ranging up to 250 psi.

(Gear pump is a product of The East Shore Machine Products Company, Dept. CP, 50 East 201st St., Cleveland 23, Ohio . . . or for more information check CP 6459 on handy form opposite last page.)



*This solvent recovery unit—reboiler, condensing and cooling elements—was fabricated of nickel-clad steel.*

**1 ECONOMY—**

High alloy layer—usually 10% or 20% of total plate thickness—assures corrosion and abrasion resistance, long equipment life.

**2 DESIGN FREEDOM—**

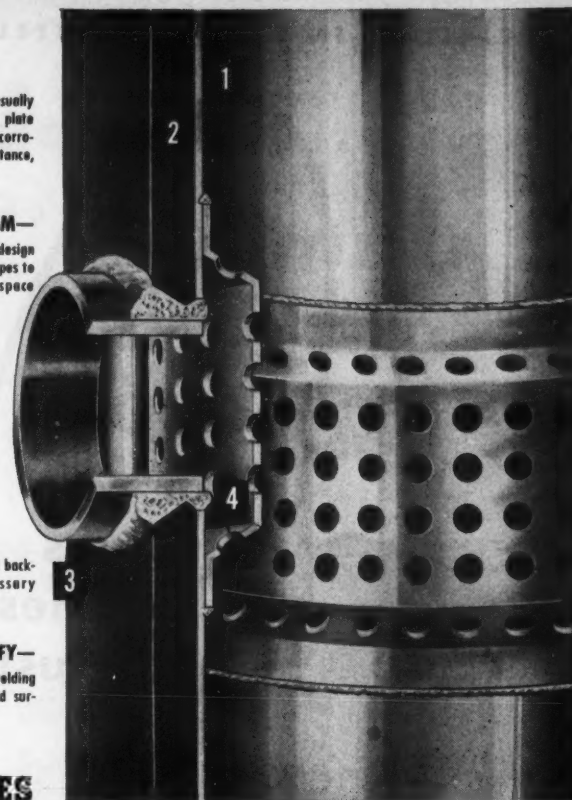
Integral bond allows design and fabrication of shapes to meet process and space needs.

**3 STRUCTURAL STABILITY—**

Low-cost carbon steel backing provides necessary strength and rigidity.

**4 EASY TO MODIFY—**

Normal cutting and welding will not endanger clad surface or bond.



**CLAD STEEL EQUIPMENT ASSURES**

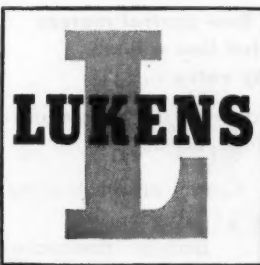
**LONG LIFE AND EASY MODIFICATION**

To help you overcome the rapid obsolescence caused by process changes when first costs are high, clad steel equipment offers two unique advantages. First, clad steel construction permits easy tank and vessel revision where new openings must be cut and flanges, pipes or attachments welded on. This means you can design for extra-long service life. The bond between cladding and backing will not tear away and allow harmful seepage.

Second, you get long-life protection from corrosion, abrasion and product contamination—all the advantages of solid, high-alloy construction—with savings up to 50% in material costs. The ASME Code permits full gage consideration for design purposes because cladding and backing are bonded over their entire surface.

Long life and low-cost protection, plus other advantages like fast heat transfer, easy cleaning and minimum maintenance, can be obtained from 16 cladding materials that meet a wide range of service conditions.

And *qualified* equipment builders know best how to apply these to your new processing equipment. By working with your own engineers and consultants from the start, they can help you get longer equipment life at lower cost. Lukens offers the widest available range of clads—stainless, nickel, Inconel, Monel, copper—and cooperates with fabricators in helping you to select the type best suited to your processing needs. If you would like more information, consult one of your builders or write Manager, Marketing Service, Lukens Steel Co., 750 Lukens Building, Coatesville, Pa.



**LUKENS CLAD STEELS**

**STAINLESS-CLAD • NICKEL-CLAD • INCONEL-CLAD • MONEL-CLAD**

PRODUCER OF THE WIDEST RANGE OF TYPES AND SIZES OF CLAD STEEL PLATES AND HEADS AVAILABLE

When inquiring check CP 6460 opposite last page

# Jumping thru a hoop for you means business for us!

• When you want such information as delivery, price and other details on an inquiry or order, you want it quickly. Damascus makes a point of quoting the same day. Many times a "same-day" quote means literally jumping through a hoop. But, good service is a sound way to obtain going business, so we give good service. Phone, wire or write Damascus about your stainless steel tubing needs to same-day quote.



**Ask us... DAMASCUS**

**DAMASCUS TUBE COMPANY**  
STAINLESS STEEL TUBING AND PIPE  
Greenville, Pennsylvania

When inquiring check CP 6461 opposite last page

## ENGINEERING AND MAINTENANCE

**Where load and pressure vary  
one steam trap operates  
without adjustment . . .**

only pipe size needed to specify requirements

**Uses:** For virtually all steam trap applications.

**Features:** Unit employs a balanced valve principle, automatically operates through complete pressure ranges up to 250 psi without adjustments, changing orifices, or valves. Only pipe size is needed to specify requirements. Trap is especially suited to process industries where load and pressure range vary.

**Description:** Bucket steam trap is designated Uni-Trap. When it is filled with condensate, bucket



Trap automatically operates through pressure ranges up to 250 psi

opens a small pilot valve, equalizing pressure on both sides of large main valve; pressure immediately becoming balanced allows bucket to continue its descent and open large capacity valve, thereby discharging condensate rapidly.

Trap is made in two styles: the standard, bottom inlet and top outlet unit; and the in-line unit, that may be repaired without removing from steam line.

All internal parts are made of stainless steel; valves and valve seats are 500

Brinell hardness. Trap is available in pipe sizes 1/2 through 2".

(Steam trap is a product of Perfecting Service Co., Dept. CP, 332 Atando Ave., Charlotte, North Carolina . . . or for more information check CP 6462 on handy form opposite last page.)

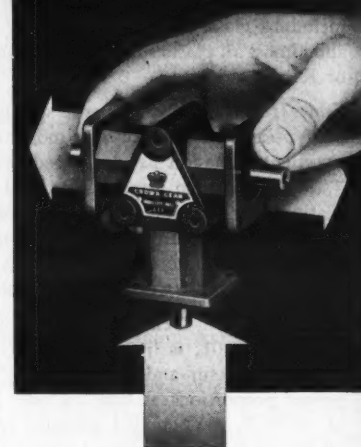
**Built-in flow control meters  
permit full line volume  
in 4-way valve . . .**

function of unit is not affected by variations in line pressure

**Uses:** Control of double-acting air or hydraulic cylinders.

**Features:** Built-in, flow-control meters permit full-line volume without loss of pressure. Line pressure variation will not affect valve function. Units

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### CROWN MITRE GEAR UNITS

...are an ideal solution to all types of right angle needs, and are especially adaptable to confined areas. They're small, rugged, quiet, and precision made. Crown Gear Units have matched "Zero" hardened gears which are mounted in double shielded ball bearings, and completely enclosed. Re-lubrication, if necessary, is easily accomplished, and four or five mounting flanges provide easy installation.

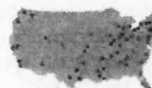
Special models will be engineered and quotations submitted for any specific problems. Write today for the name of your local distributor. Crown Gear Units are available almost everywhere.

Write for engineering details.

### CROWN GEAR



a subsidiary of Harrington & Richardson, Inc.  
320 PARK AVENUE, WORCESTER 10, MASS.



Over 120 leading distributors in 43 states, Crown Mitre Gear Units are where you want them . . . when you want them.

Sold in Canada by H & R Arms Co., Ltd.  
Montreal 23, P. Q., Canada

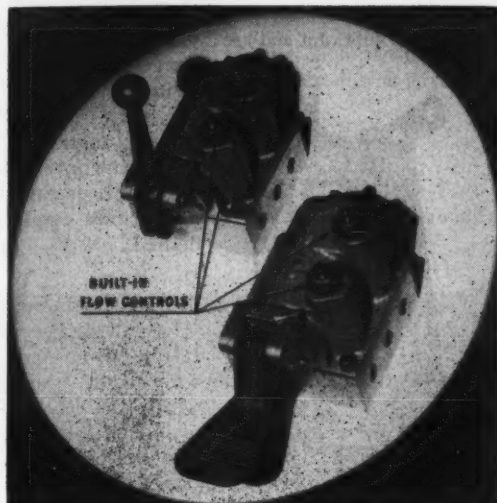
When inquiring check CP 6463  
opposite last page

CHEMICAL PROCESSING



are built for heavy-duty service and long operating life. They have one balanced spool using renewable O-ring packing.

**Description:** Basic hand-and-foot operated 4-way valve is also available for remote pilot operation, cam, single or double solenoid together with time-



Valves have one balanced spool using renewable O-ring packing

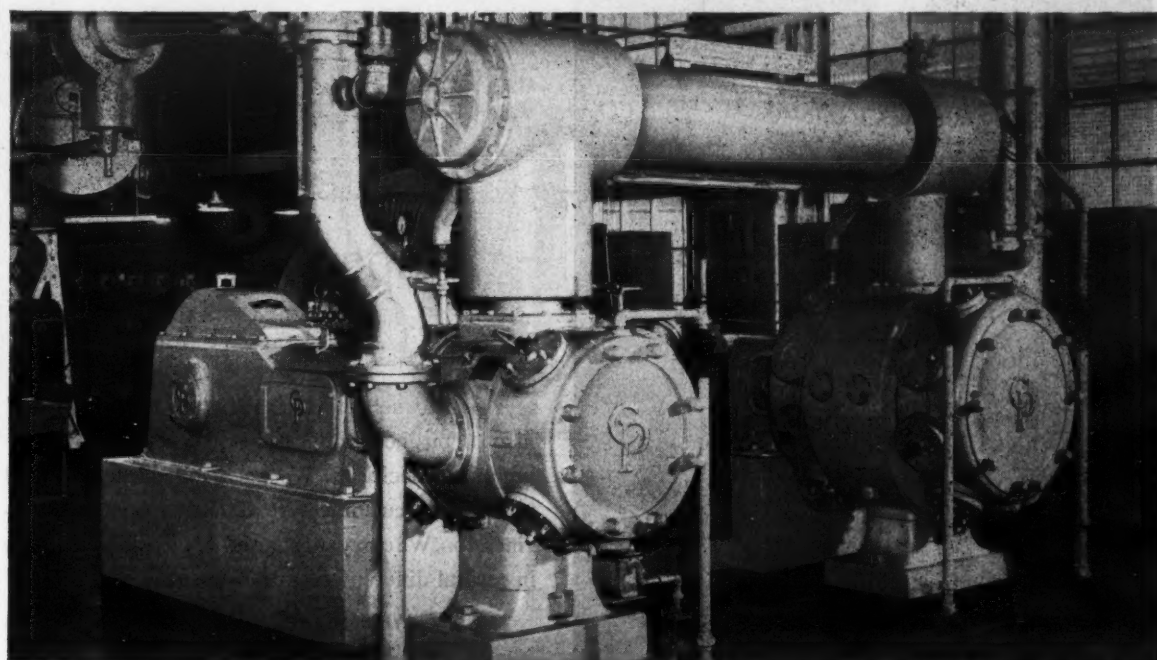
delay features. Non-corrosive throughout, this compact unit is available in four standard pipe sizes —  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$ " — for air, oil, or water, in pressure range 0-150 psi.

(4-Way valve is a product of Airmatic Valve, Inc., Dept. CP, 7317 Associate Ave., Cleveland 9, Ohio . . . or for more information concerning manufacturer's product reader may simply check CP 6464 opposite last page.)

#### Details and data on pumps for process industries

Centrifugal pumps designed especially for the chemical, food, and other process industries are described in eight-page bulletin. Units are designed to handle acids, alkaline liquors, slurries, and other process liquids. Construction details, outlines of specifications, charts on interchangeability of parts, and performance curves of pumps are included. Also listed are various materials of construction in which pumps are available.

Bul 725.4 is available from Goulds Pumps, Inc., Dept. CP, 75 Falls St., Seneca Falls, N. Y. When inquiring reader may simply specify CP 6465 on handy form which is located opposite last page.



The dependability of CP's heavy-duty Class O-CE horizontal duplex compressors is reflected in repeat orders. Typical of these is one from a prominent electrical manufacturer: The first CP Compressor in this plant—300 HP size—was installed in 1935 . . . the second—rated 400 HP—was added in 1951. Both operate continuously, with remarkably low upkeep . . . and they should be "going strong" in 1975.

The long life, low upkeep and high efficiency of O-CE Compressors are due to their moderate ratings, Simplate Valves, completely effective and easy-to-clean intercoolers, and their roller main and crankpin bearings. Built in sizes up to 2,000 HP, they're available in single and multi-stage designs, steam and electric drives, for pressures up to 15,000 pounds. For details write *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*



## Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

When inquiring check CP 6466 opposite last page



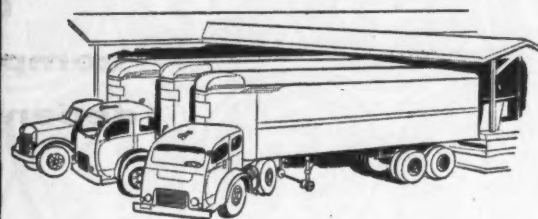
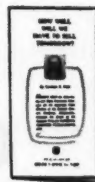
Roy Fruehauf, President, Fruehauf Trailer Company



## NATIONAL BUSINESS PUBLICATIONS, INC. 1001 Fifteenth Street, N. W., Washington 5, D. C. • STerling 3-7535

The national association of publishers of 171 technical, professional, scientific, industrial, merchandising and marketing magazines, having a combined circulation of 4,049,550...audited by either the Audit Bureau of Circulations or Business Publications Audit of Circulation, Inc....serving and promoting the Business Press of America...bringing thousands of pages of specialized know-how and advertising to the men who make

decisions in the businesses, industries, sciences and professions...pin-pointing your audience in the market of your choice. Write for list of NBP publications and the latest "Here's How" booklet, "How Well Will We Have to Sell Tomorrow?" by Ralston B. Reid, Advertising & Sales Promotion Manager, Apparatus Sales Division, General Electric Company, Schenectady, N. Y.



## "Business Publications Are Vitally Important To Me..."

says Mr. Fruehauf. "Frequently I find facts and ideas in business publications that help me to make important decisions. We know our customers and prospective customers read *their* business magazines, too. We carry substantial advertising schedules in several different groups of business periodicals."

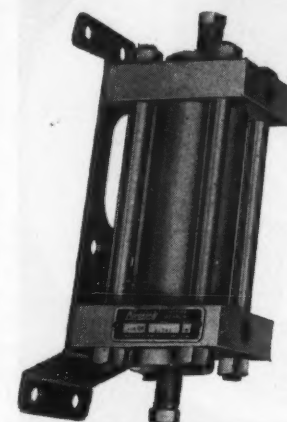
*It is good thinking to judge an advertising medium by the value its editorial pages deliver to regular readers. Business publications provide a direct sales route for any product or service of benefit to business or professional men.*

## ENGINEERING AND MAINTENANCE

### Predetermined quantity of lubricant supplied small motors, bearings, by measuring valve

**Uses:** Automatically applying metered quantities of oil or grease to gear cases, small transmissions, bearings, electric motors.

**Features:** Units dispense predetermined measured quantities of lubricant and are available with any discharge output range desired. An adjusting screw at each end of measuring chamber controls the exact quantity of lubricant output desired.



Set screw at each end of measuring valve controls exact quantity of lubricant output desired

**Description:** Lubricant measuring valves are designed for use with a four-way control valve, which is supplied with lubricant from a power-operated pump. Valve has mounting brackets to facilitate installation.

(Lubricant measuring valve is a product of Lincoln Engineering Co., Industrial Div., Dept. CP, 5780 Natural Bridge Ave., St. Louis 20, Mo. . . or for more information check CP 6468 on handy form opposite last page.)

### Alkaline, solvent resistant finishes quickly removed by stripper . . .

used undiluted at 200°F, takes off 1/2" coat of Epon and phenolic primes in 2 1/2 hr

**Uses:** For the removal of alkaline and solvent resistant finishes such as Epons and phenolics.

**Features:** Test example indicates that undiluted stripper at 200°F removed 1/2" thick Epon and phenolic prime coating in 2 1/2 hours.

**Description:** Material, called Strypp-Away, is a dark liquid with a spicy odor containing complex alcohols, phenols, and an activator which promotes penetration of chemical-resistant finishes. It is used straight or diluted with water depending upon finish. Normal operating temps are from 160 to 200°F. Stripper is safe on steel, stainless steel, iron, copper, brass, and chrome. It is not recommended for use on aluminum, zinc, or other soft metals.

(Paint stripper is a product of The DuBois Co., Inc., Dept. CP, 1120-40 W. Front St., Cincinnati 3, Ohio . . . or check CP 6469 on handy form opp. last pg.)

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**Shear strengths up to 3500 psi  
yielded by metal-to-metal,  
metal-to-plastic bonds . . .**

structural adhesive is a modified epoxy resin curing-type

**Uses:** Bonding metal-to-metal, metal-to-plastic.

**Features:** Two of these modified epoxy resin adhesives are offered, one giving high strengths at normal temps, the other extreme flexibility at elevated temperatures.

**Description:** Adhesive formulation, Bondmaster M615, for normal temperature use, is said to yield shear strengths of up to 3500 psi (Air Force Tensile Shear Method), with accompanying peel strength up to 19 lb (NEMA method).



Aluminum-to-aluminum bonded strips bent to a half circle still maintain 1500 psi bond after being subjected to temperatures over 300°F

Other adhesive formulation, Bondmaster M616, provides shear strengths up to 3000 psi at 180°F, while maintaining excellent flexibility (see photo.)

(Structural adhesives are products of Dept. P, Rubber and Asbestos Corp., Dept. CP, 225 Belleville Ave., Bloomfield, N. J. . . or for more information check CP 6472 on handy form opp. last page.)

#### Approaches to better maintenance

Size and complexity of today's maintenance problem and the necessity of applying to it a sound engineering approach is discussed in 26-page brochure. Also presented is a comprehensive program for planning and controlling plant maintenance. Eight basic points that constitute a complete maintenance program are covered.

"Get Better Maintenance" is available from Anderson-Nichols & Company, Dept. CP, 150 Causeway St., Boston 14, Mass. When inquiring specify CP 6473 opposite last page.



Arc welding of the Filter/Separator.



Gasoline Filter/Separator made by Bendix-Skinner Division almost entirely of Revere 90-10 Cupro-Nickel.

It has been found that minute traces of water in aviation gasoline can stop the engine when flying in low temperatures, as at high altitudes, or over the pole. The amount of water involved is so small that it would not bother an automobile carburetor. To remove it for safe flying requires a special Filter/Separator. All metal parts going into this filter were specified to be 90-10 Cupro-Nickel. One of the contractors for the U. S. Navy is the Bendix-Skinner Division of the Bendix Aviation Corporation, Royal Oak, Mich. When Bendix-Skinner obtained the order, it called in Revere's Technical Advisory Service. A complete study was made of the blueprints and specifications, in order to set up the most economical purchasing schedules. When production began, personnel from the Welding Section of the Research and Development Laboratory maintained by Revere in Rome, N. Y., went to the Bendix-Skinner plant to share their know-how with the welders, so as to be sure the welds would pass strict inspection, yet be made at competitive costs.

Cupro-Nickel, 90-10, is highly resistant to corrosion and other forms of attack. Because it contains only 10% nickel, it is more economical than the richer alloys, yet in many applications just as satisfactory. We suggest you look into it.

## REVERE

**COPPER AND BRASS INCORPORATED**

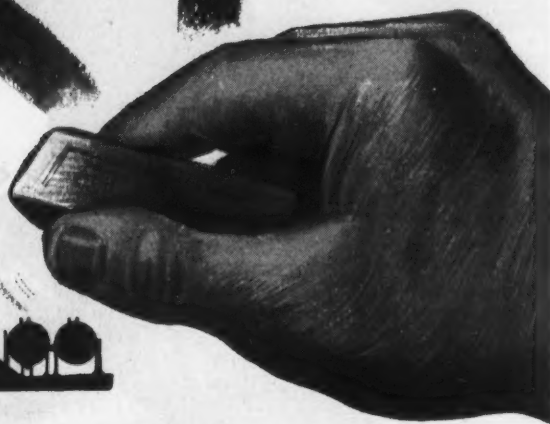
Founded by Paul Revere in 1801  
230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.;  
Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.  
Sales Offices in Principal Cities, Distributors Everywhere.

When inquiring check CP 6474 opposite last page

## How to erase

# DUST



## from your CHEMICAL PLANT AT LOW COST!

Whatever your dust problem, you can solve it at low cost with a Johnson-March engineered dust control system. Experience in both liquid and dry systems enables Johnson-March engineers to specify whichever type will solve your problem most effectively.

Your application may call for an economical liquid system for stopping dust right at its source in the handling of bulk materials. These engineered systems cost only 1/10 that of most dust handling systems.

If you are interested in dry collection of dust or recovery of valuable materials, J-M Dual-Clone Dust Collectors or Reverse Air Jet Filters offer high collection efficiencies and substantial savings.

Johnson-March engineers will, at no obligation, gladly analyze your dust conditions and show you how easily and economically you can eliminate your dust nuisance and hazard. Mail the coupon today for results that pay.

THE JOHNSON-MARCH CORP. CP  
1724 Chestnut St., Philadelphia 3, Pa.

At no obligation, please

- ☐ Send informative data on J-M dust control systems.  
☐ Have an engineer analyze our dust problem.

NAME.....TITLE.....  
COMPANY.....  
ADDRESS.....  
CITY.....STATE.....

# Johnson March

Dust Control Engineers

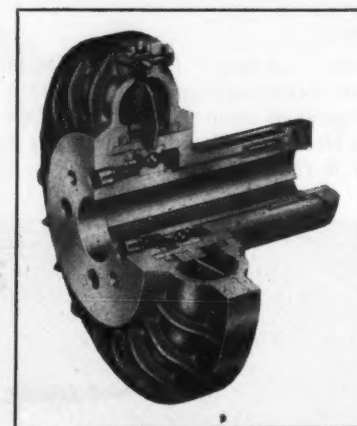
1724 CHESTNUT STREET, PHILADELPHIA 3, PA.

CANADIAN REPRESENTATIVES: G. F. Sterne & Sons, Ltd., Brantford, Ontario

When inquiring check CP 6475 opposite last page

## engineering and maintenance

*won't slip  
at normal speeds*



**Uses:** For industrial drives involving heavy inertia and shock loads on such equipment as compressors, centrifuges, conveyors, and crushers.

**Features:** At normal operating speeds, this dry fluid drive will not slip. At the same time, in case of overload, slippage gives protection. Drive produces constant torque for a given input speed, regardless of percentage of slip between rotor and housing, which occurs only during starting and overload.

Having low initial cost, low maintenance requirements, and giving top efficiency, the drive permits use of smaller motors and controls, with reduced current demands and improved power factor.

**Description:** Dry fluid drive is made up of a housing, inside of which a rotor is free to turn concentrically. Between the two are fine particles of spherical steel shot, called the "flow charge", which act very much like a fluid. It is the flow charge which transmits power from the housing to the rotor. This flow charge is easy to seal in, has a high density, and can stand relatively high temperatures.

Amount of flow charge determines torque capacity. Because it is easy to vary amount of charge, drive will give exact starting torque needed for anything from the smoothest to the fastest start.

Accurate overload protection is assured since the drive can be set to slip anywhere from a gentle 20% over full load torque to as high as peak motor torque. During starting and overload periods the current draw is at a minimum because with the

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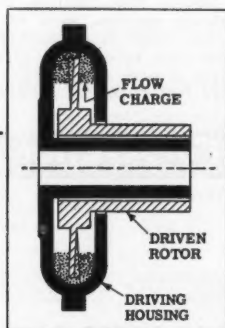


**Dry fluid drive produces constant torque for a given input speed, regardless of slip during starting or overload**

standard drive setting the motor is never pulled down to less than 90% of synchronous speed.

The drive is simple to select "off-the-shelf". Each size has a standard horsepower rating, yet flow charge can be varied quickly to give exact torque required to suit job.

Two lines will be available: 1) Drives for convenient mounting directly on motor shafts and adapted for company's Taper-Lock sheaves; and



## HOW IT WORKS

- 1) Motor is connected to housing, and starts it turning at no load.
- 2) Flow charge is thrown to circumference of housing, is compressed by centrifugal force, and revolves with housing.
- 3) Rotor, connected to load, is started and accelerated by friction and wedging action of revolving flow charge.
- 4) Rotor and housing reach identical speeds — drive operates at zero slippage between motor and load at normal running speeds.
- 5) In case of overload, before damage is caused, rotor slips relative to housing, overcoming friction and wedging action of flow charge. A thermal switch, which automatically cuts electrical circuit if an overload persists, is available.

2) special couplings, with Taper-Lock bushings for straight-line drives. First to be offered from stock will be four sizes rated from 3 to 30 hp at 1800 rpm. Other sizes will follow.

(Flexidyne dry fluid drive is a product of Dodge Manufacturing Co., Dept. CP, Mishawaka, Ind. . . . or for more information check CP 6476 on handy form opposite last page.)

Operating experience over a long period of years has proved that Monel and Nickel are highly satisfactory materials for handling chlorinated solvents. A large Southwestern chemical plant uses this Monel equipment in the handling of moist carbon tetrachloride.

# Where chlorinated solvents act up... Nickel and Monel stand up!

**Chlorinated hydrocarbons** are not exactly corrosives — but they frequently get out of hand.

And when they do, the intensity of their attack varies all over the lot.

**Temperatures and pressures** have their effects, as do differences in the nature and purity of the solvent itself.

**Where there is corrosion**, it is due largely to the hydrochloric acid formed by decomposition in the presence of water. Some metallic materials are not only attacked by the acid — *they actually catalyze the reaction!*

What's the answer to this problem? A simple one — use Nickel or Monel for your equipment. *Both have the ability to resist dilute HCl.*

**What's more**, both are inherently strong, an added property which justifies their wide-spread use as construction materials for such equipment as distillation units . . . degreasing units . . . dry cleaning systems . . . recovery stills and condensers . . . storage tanks.

**Where heavy equipment** is involved, the *cost* of it may cause some pencil sharpening. So remember this — you can keep costs down by using Lukens Nickel-Clad (or Monel-Clad) Steel. Here, a relatively thin layer of Nickel or Monel is metallurgically bonded to a heavy steel plate. Lukens clad steels afford economical resistance to many corrosive agents, and safeguard the products handled from contamination or discoloration.



Detailed information on the *Resistance of Nickel, Monel and Other High-Nickel Alloys to Corrosion by Hydrochloric Acid, Hydrogen Chloride and Chlorine* is to be found in *Technical Bulletin T-29*. We'll be glad to mail you a copy on request. And of course Inco's Corrosion Engineering Section is always ready to help you with specific problems dealing with the handling of chlorinated solvents. Be sure to call on them when you need help.

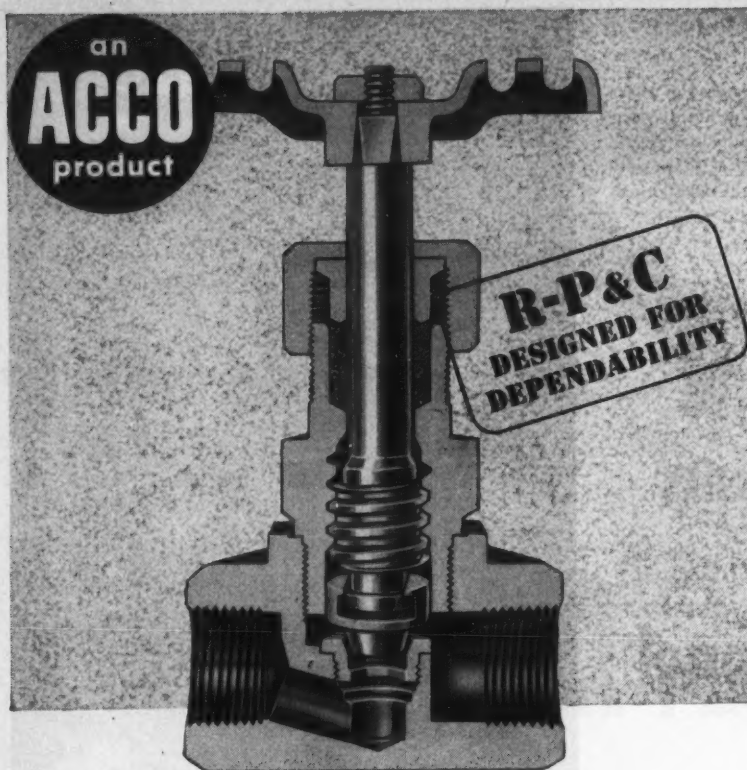
**THE INTERNATIONAL NICKEL COMPANY, INC.**  
67 Wall Street New York 5, N. Y.



## Nickel Alloys

MONEL® • "R"® MONEL • "K"® MONEL • "KR"® MONEL  
"S"® MONEL • INCONEL® • INCONEL "X"®  
INCONEL "W"® • INCOLOY® • NIMONIC® Alloys  
NICKEL • LOW CARBON NICKEL • DURANICKEL®

When inquiring check CP 6477 opposite last page



## R-P&C Bar Stock Valves

• RATED FOR 10,000 PSI

• FOR CLOSE CONTROL, HIGH TEMPERATURES OR PRESSURES

These rugged bar stock valves were originally developed by R-P&C for close control or instrument use. However, their versatility has proven itself in so many different applications that they are now considered general purpose valves. They are particularly applicable for services involving throttling, or high temperatures and pressures, and are especially adapted for use in crowded applications such as panel boards.

Rated for 10,000 psi at 150°F., each carbon steel bar stock valve is individually tested at 15,000 psi before leaving the factory. They are supplied in sizes from 1/4 to 1", in globe and angle styles with female ends, male and female ends, or male union ends. They can be furnished in 12-14 chromium stainless steel and 18-8 molybdenum stainless steel for corrosive applications. May also be supplied with special stellite discs for extra abrasion resistance in extremely severe throttling services. Those other than carbon steel are rated at 4,000 psi at 150°F.



**FREE  
WALL  
CHART**

"How to Protect Your Valves"  
17 x 22" wall chart gives installation  
and operation pointers. Tells  
how to protect valves, prolong  
life. Write for your copy.

R-P&C's complete selection of bar stock valves is only one element in a complete valve line which includes gate, globe, angle and check valves in a wide range of sizes and styles, in bronze, iron and cast and forged steel. See your R-P&C Distributor or write for catalog.

**ACCO**



**R-P&C Valve Division  
AMERICAN CHAIN & CABLE**

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit,  
Houston, New York, Philadelphia, Pittsburgh, San Francisco,  
Bridgeport, Conn.

**R-P&C  
valves**

When inquiring check CP 6478 opposite last page

## MAINTENANCE

**Over-run feature guards  
thermo element in temp  
regulator**

**Uses:** Temperature regulating.

**Features:** Regulator has an over-run feature for protection of thermal element in event temp at bulb exceeds range of regulator.

**Description:** Temperature regulator may be mounted directly on heat exchangers, instant water heaters, and other units that have inlet connections on top. Wearing parts of unit are of stainless steel or bronze and can be renewed. A two-ply bellows is used in thermal unit for added power, longer life.

Body of regulator is bronze or semi-steel. All trim is either bronze or stainless steel. It is available with screwed connections in sizes from 1/2 to 2" and with flanged connections in sizes from 2 to 8". All 1/2 to 4" sizes are spring-loaded and all sizes from 6 to 8" are weight-loaded.

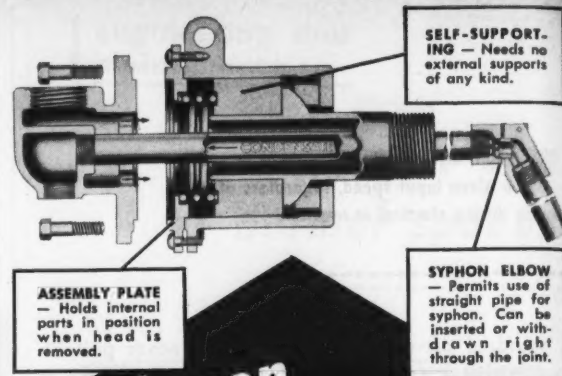
(Angle Type T temperature regulators are products of O. C. Keckley Co., Dept. CP, 400 W. Madison St., Chicago 6, Ill. Check CP 6479 opposite last page.)

**Describes alloy steel  
that's fast-machining**

Introduction of lead in alloy steels greatly increases machinability. Theory is that it acts as a lubricant to the cutting tool. Rycut 40, a Cr-Mo .40 carbon steel alloy containing 0.15 to 0.35% lead, gives fast machinability while retaining full mechanical properties.

Physical properties, machining data, and case histories of how customers increased production using this steel are presented in eight-page two-color technical bulletin. Company's certified alloy steel plan is also described.

Bul 14-5 is issued by Box 8000-A, Joseph T. Ryerson & Son, Inc., Dept. CP, Chicago 80, Ill. Specify CP 6480 opposite last page.



**Johnson  
Rotary Joint  
with SYPHON ELBOW**

Johnson Joints represent the best way industry has yet found to get steam or liquids into rotating rolls and cylinders. They are completely packless, need no lubrication or adjustment. The Type SBP shown gets steam in, condensate out, through the same head. Other types available for through flow service, in sizes to meet all operating needs.

**WRITE FOR COMPLETE INFORMATION.**

**The Johnson Corporation**

826 Wood St., Three Rivers, Mich.

When inquiring check CP 6481 opposite last page

## ERTEL ASBESTOS FILTER SHEETS

**... Used where performance counts!**

Ertel asbestos sheets are available in ten uniform grades for all filters up to 25" square. Manufactured under rigid control, they are acid treated to meet Ertel standards of low leachable calcium and iron content. Sheets are checked constantly by a reputable analytical laboratory. Copies of their reports are available.

If you are not already a user of Ertel sheets, try them at no obligation on your next filtration run. We will test filter your product at no charge in our laboratory in order to recommend the correct grade.

**ERTEL ENGINEERING  
CORPORATION**  
KINGSTON 3 NEW YORK



When inquiring check CP 6482 opposite last page

CHEMICAL PROCESSING





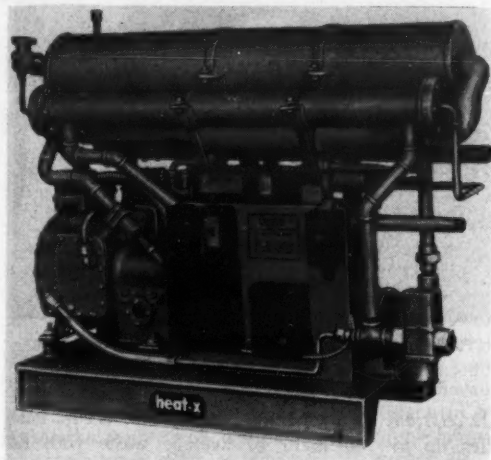
**Water chilling "package"  
available in models  
from 2 to 15 hp . . .**

only power and water connections necessary

**Uses:** In chilled water air-conditioning systems, drinking water cooling applications, and industrial water cooling uses.

**Features:** Available in models from 2 through 15 hp, units are furnished completely wired, charged with Freon, requiring only power and water connections for operation.

**Description:** Condensers, chillers, and heat exchangers of the package chillers, designated PC, are of Inner-Fin construction. This permits a greater capacity with less bulk. Circulating pumps are non-overloading with mechanical seals to eliminate danger of leaks; hermetic compressors are standard.



Construction of chillers permits greater capacity with less bulk

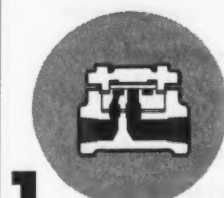
On the 10 and 15 hp models, two separate refrigeration systems with thermostatic controls in water return lines to chillers permit operation at 50% capacity.

(Package chillers are a product of The Heat-X-Changer Co., Dept. CP, 1000 N. Main St., Brewster, N. Y. Check CP 6483 opposite last page.)

**Provides continuous removal  
of vapor from air, gases**

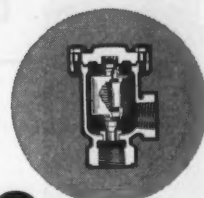
Illustrated description of a unit which provides continuous removal of petroleum vapors, dirt and liquids from air and gases is presented in four-page bulletin.

Bul SC-1047 is available from Sela Corporation of America, Dept. CP, Erie Ave. and D Street, Philadelphia 34, Pa. When inquiring specify CP 6484 on form opposite last page.



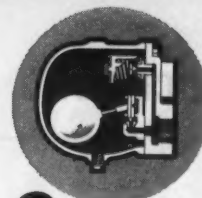
**1 Sarco Thermodynamic**

Valve head, a solid stn. st. disc, is only moving part. Same head and seat to 600 psi. Withstands superheat, water-hammer, corrosive condensate. Cat. 255-A



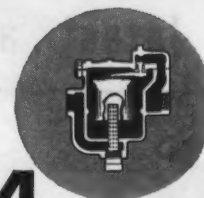
**2 Sarco Balanced  
Pressure Thermostatic**

Greatest capacity per dollar cost. Large air venting capacity. Same head and seat, 0-300 psi. Freeze-proof. Cat. 250-A



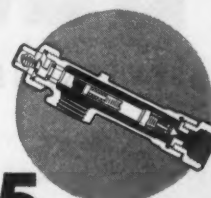
**3 Sarco Float-  
Thermostatic**

Discharges condensate continuously at steam temperature and without shock. Responds immediately to varying loads and pressures. Cat. 450-A



**4 Sarco Camlift Bucket**

New, powerful Camlift valve mechanism permits greater discharge with no increase in size of trap body. Cat. 360-A



**5 Sarco Liquid Expansion**

Adjustable to discharge condensate **BELOW 212°F.** Freeze-proof. Not affected by water-hammer or pressure pulsations. Cat. 260-A.

## How to get efficient steam trapping ... throughout your plant

With these **5 Basically Different Types** of Sarco Steam Traps you can select the trap with the characteristics that match your **specific** job conditions.

Just because a steam trap discharges condensate and air and closes to steam doesn't necessarily mean it's doing a good job. For maximum efficiency, a trap must also keep conditions within the steam spaces right for the heat transfer job to be done.

For example: A Bucket Trap will work on a unit heater—but its discharge is intermittent. Between discharges, condensate collects in the small steam space of the heater causing undesirable changes in air temperature. The continuous dis-

charge Float-Thermostatic Trap will, however, keep the heating surface free from condensate **all the time**—insure uniform air temperature.

That's why no one type of steam trap can give best trapping results under all job conditions. And that's exactly why Sarco makes **5 basically different** types of steam traps—each with a different set of operating characteristics.

**Solve Your Trapping Problems**

And because Sarco makes all 5 types—not merely variations of one type—you can always get **impartial** advice from Sarco, based on over 43 years of field experience. Write to your local Sarco representative or to Sarco Company, Inc., Empire State Building, New York 1, N. Y.

**ONLY SARCO** makes all 5 types of steam traps

—not merely variations of one type!

2110 B

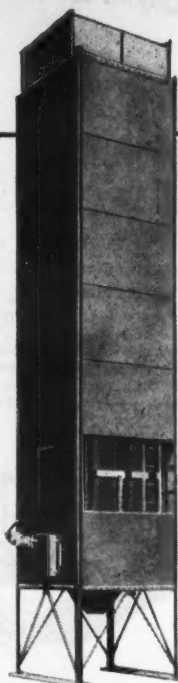
When inquiring check CP 6485 opposite last page

The latest advancement in

dust recovery

# Dualaire\*

REVERSE-JET DUST COLLECTOR!



- Cleans without jarring or rapping!
- Maintains uniformly low pressure drop!
- Field-proven efficiency as high as 99.99%!

Backed by the same organization that pioneered commercial application of COTTRELL Precipitators and MULTICLONE Collectors, the DUALAIRE Reverse-Jet Dust Collector is revolutionizing filter-type recovery systems. The DUALAIRE gives you vital advantages like these...

#### REVERSE-JET CLEANING ACTION

cleans the filter tube continuously in small increments—not with sudden surges as in rapping or jarring.

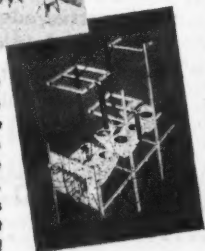
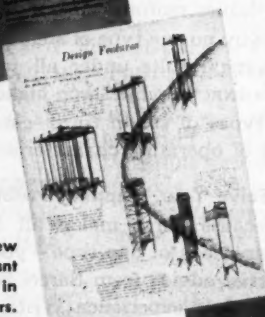
**CLEANING ACTION** starts automatically and stops automatically to keep pressure differential within low pre-set range.

**FILTER EFFICIENCY** remains uniformly high at all times because no thick filter cake ever forms to reduce operation

effectiveness. Actual field tests show efficiencies as high as 99.99%!

**NO STANDBY UNITS**, with their complicated switching devices, are needed. The DUALAIRE is cleaned as it filters—without interruptions or shut down periods for cleaning. The operation is continuous!

**FILTER UNITS LAST LONGER** because they are not subjected to intermittent jarring, rapping or vibration—all destructive to filter fabrics.




The above are only a few of the many important advantages you get in DUALAIRE Dust Collectors.

This 12 page booklet gives the full story... explains how reverse-jet cleaning action works — shows how the basic DUALAIRE unit is adaptable to a wide range of operating requirements — provides facts, figures and illustrations that will change your thinking on filter-type recovery systems.

Send for your free copy of this descriptive booklet — or see your nearest Western Precipitation representative!

\*"Dualaire" & "Multiclone" ®

Licensed by H. J. Hersey, Jr.



## WESTERN Precipitation CORPORATION

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR  
COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1023 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA  
CHRYSLER BLDG., NEW YORK 17 • 1 N. La SALLE ST. BLDG., CHICAGO 2  
3252 PEACHTREE RD. N.E., ATLANTA 5 • HOBART BLDG., SAN FRANCISCO 4  
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

When inquiring check CP 6486 opposite last page

## ENGINEERING AND MAINTENANCE

### Solution to waste disposal offered by incinerator that's "portable"

**Uses:** While basically designed for burning ordinary waste with an overall moisture content of 20 to 30%, modifications of incinerator are easily made to permit disposal of greater amounts of garbage, or of pathological waste.

**Features:** Factory-assembled incinerator is ready for immediate operation. It is designed with permanent steel skids so it can be easily moved. Stack is self-supporting with refractory-lined stack optional. Gas burner can be incorporated in unit.

Monolithic linings, steel casings, and split-guillotine doors are also features.



Factory-assembled incinerator is ready for use after connection to stack or breech

**Description:** Incinerator, Model No. GT48, handles up to 280 lb/hr of average waste with no smoke or odor. Other models handle up to 450 lb/hr. Furnace section can be located on either right side or left to provide maximum ease of charging in close quarters. This also permits placing breeching outlet closer to an existing stack. Breeching outlets can be on top, side, or front.

(Portable incinerator is a product of Plibrico Company, Dept. CP, 1800 N. Kingsbury Street, Chicago 14, Ill. Check CP 6487 opposite last page.)

### Features and specifications of lubed plug valves

Company's line of lubricated plug valves and accessories are completely described in 42-page catalog. Units covered include semi-steel, multiport, round port, steam-jacketed, V-port and diamond port, bronze and aluminum.

Cat 5 is available from ACF Industries, Inc., Dept. CP, 30 Church St., New York 8, N.Y. Specify CP 6488 opposite last page.



## DESIGNED FOR VERTICALLY FIRED PETROLEUM HEATERS



### National Airol VERTICAL Oil-Gas Tandem Combustion Units many more hours on stream, without forced shutdown

Exclusively for vertical firing, National Airol VERTICAL C-P Tandem Block Units retain all the features of our regular well-known Tandem Units . . . plus: special pre-cast refractory shapes for easier installation and maintenance; secondary air louvers for positive control of flame pattern; and an all steel duplex detaching gear which enables swift, easy, oil burner removal. VERTICAL C-P Tandem Units hold air in the combustion zone until fuel and heated air are thoroughly mixed. This means that ignition takes place in a hot zone; the result: high fuel economy through more rapid combustion with a minimum of excess air. NATIONAL AIROL's patented Tandem Combustion Blocks allow secondary air to be easily and accurately controlled. By adjusting air control louvers, flame can be shaped to radiate heat uniformly without tube impingement.

ALL VERTICAL Tandem Units are fired with NATIONAL AIROL Combination Oil and Gas Burners . . . have a high turn down ratio with steady flames . . . maintain high flame temperatures using either fuel oil or gas. With the C-P TANDEM UNIT's clean flame, a cold furnace can be brought to full capacity in a shorter time.

"Many, many more hours on stream, without forced shutdown" . . . yes, YOU will realize high profits from YOUR heaters when National Airol C-P VERTICAL Tandem Units are specified. Our new folder 498 is yours for the asking.

### NATIONAL AIROL BURNER CO., INC.



CHEMICAL-PETROLEUM DIVISION

1300 EAST SEDGLEY AVE., PHILADELPHIA 34, PA.

Southwestern Division: 2512 South Boulevard,  
Houston 6, Texas

INDUSTRIAL OIL BURNERS, GAS BURNERS, FURNACE EQUIPMENT

When inquiring check CP 6489 opposite last page

APRIL, 1955

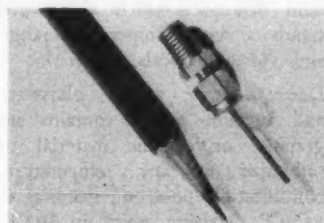
## MAINTENANCE

### No flaring necessary to connect capillary tube fitting . . .

available in brass, aluminum,  
steel, Monel

Uses: Fittings for capillary  
tube in the range of 1/16".

Features: With this fitting no  
flaring is necessary, no special tools  
are required for installation, nor  
is any preparatory work on tube  
required.



In use, capillary tubing is simply  
slipped into fitting, nut is turned  
until a tight seal is secured, and  
installation is ready for operation.

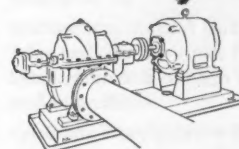
Description: This 1/16" capil-  
lary tube fitting is available in brass,  
aluminum, steel, stainless steel, and  
Monel.

(Capillary Swagelok tube fittings  
are product of Crawford Fitting  
Co., Dept. CP, 884 East 140th St.,  
Cleveland 10, Ohio . . . or for  
more information check CP 6490  
on handy form opposite last page.)

### Points out properties of blue asbestos

Unusual characteristics of im-  
ported South African blue as-  
bestos are pointed out in two-  
page bulletin. Wide range of  
uses is discussed along with  
ease of handling, acid and  
heat resistance, and material's  
ability to combine with other  
products.

Bul 201 is issued by North  
American Asbestos Corp.,  
Dept. CP, Board of Trade  
Bldg., Chicago 4, Ill. When  
inquiring specify CP 6491 on  
handy form opposite last page.



### easily installed in split-case pumps

This new addition to the "JOHN CRANE" family of anti-corrosive Type 9 Seals is the answer to a simplified means of seal installation (or removal) in modern split-case pumps.

Need for unbolting the upper half of the casing is eliminated, since the unit is mounted on a sleeve with an outside clamping ring.

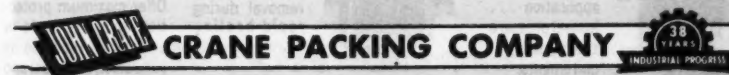
Sealing members of DuPont Teflon readily adapt this seal to the handling of chemicals, solvents and corrosives, plus high temperature and similar conditions under which rubber cannot be used.

Springs and metal parts are furnished in the metallurgical specification best suited to the service.

Wherever "hard-to-handle" liquids or gases are involved . . . temperatures from -90° to +485°F . . . pressures to 750 psi . . . the "John Crane" Type 9 Seal is the seal for your pump.

Get complete facts and engineering data on the "John Crane" Type 9 Packaged Seal with outside clamping ring. Contact Crane Packing Co., 1821 Cuyler Avenue, Chicago 13, Ill. In Canada: Crane Packing Co., Ltd., 617 Parkdale Ave., N. Hamilton, Ont.

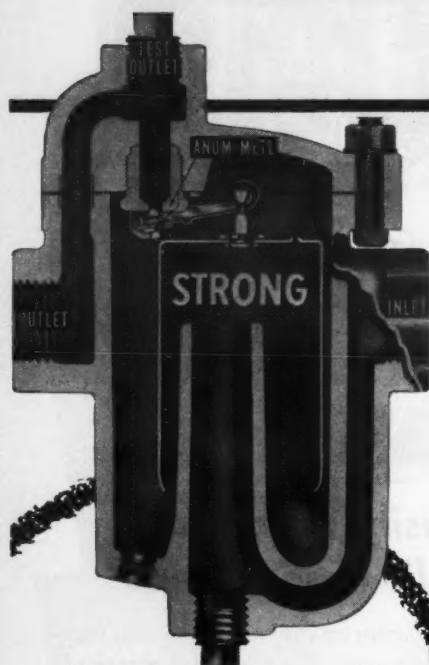
\*DuPont Trademark



When inquiring check CP 6492 opposite last page

# HYDRO-FLEX

■ ■ ■ We engineered this new steam trap for YOU!



**STRONG®**  
**HYDRO-FLEX**  
**STEAM TRAPS**

high efficiency under all condensate loads

Available from over 200 industrial distributors in the United States, Canada and Foreign Countries.

- ☐ Install Strong Hydro-Flex steam traps with assured confidence. This completely new line of low, medium, and high pressure steam traps will operate equally well on light and heavy condensate loads.

Hydro-Flex offers these outstanding features and more:

- greater discharge capacity and efficient operation under all conditions
- dual fulcrum arrangement that snaps the leak-free valve wide open to give unrestricted condensate flow
- all working parts and deep-drawn bucket of durable stainless steel.
- rugged construction features assure long trouble-free service.

For complete information, contact your local Strong Distributor and write for new Bulletin No. SS-40A.

**STRONG, CARLISLE & HAMMOND CO.**  
1302 W. 3RD. STREET  
CLEVELAND 13, OHIO



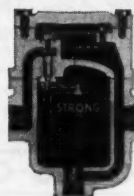
#### BOTTOM INLET SERIES

Hydro-flex traps with bottom inlet have the same high qualities and features as horizontal types.



#### PRESSURE REGULATING VALVES

3 types available for wide range application . . . to meet pressure and capacity requirements.



#### BLAST TRAPS

Thermal types for quick air and condensate removal during rapid heating up.



#### STRONG STRAINERS

Offer maximum protection from dirt, scale or sediment. Available in semi steel, cast steel and bronze.

When inquiring check CP 6493 opposite last page

## MAINTENANCE

**Combine silicone, MoS<sub>2</sub> for lubing of glass, vacuum apparatus**

**Uses:** Lubrication of vacuum apparatus. Material also serves as seal and thread compound for making tight threaded joints in stainless steel, glass, or other chemical pipe-work.

**Features:** Lubricating and sealing material combines chemical inertness and temperature-viscosity relationship of silicone liquids with lubricating qualities of molybdenum disulfide, which also withstands a wide temperature range and most chemicals.

**Description:** This glassware and vacuum grease contains no graphite or organic material to carbonize at any temperature. Solidification point of material is -50°F. Melting point is 392°F. It is resistant to chemical attack and oxidation and resistant to all aqueous reagents, particularly the alkali reagents. Material is insoluble in alcohols, ketones and water, dispersible in some hydrocarbons.

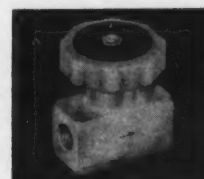
(Mo-Silicone glassware and vacuum grease is a development of Lubricants Div., The Lockrey Company, Dept. CP, P. O. Box J, Southampton, N. Y. . . or for more information reader may simply check CP 6494 on handy form opposite last page.)

## Fluid power equipment — an overview

Complete line of pumps, motors, transmissions, cylinders and valves is illustrated and described in 12-page bulletin. Featured are an electric-hydraulic servo control system for pumps and transmissions up to 150 hp, a line of gear reducers, and higher-capacity variable-feed pumps.

Bul 10051-D is available from The Oilgear Co., Dept. CP, 1560 W. Pierce St., Milwaukee 4, Wis. When inquiring specify CP 6495 on handy form which is located opposite last page.

## a manual SHUT-OFF VALVE that doesn't leak



- "O" Ring seal for dead tight shutoff
- 416 Stainless barstock body
- Liquid or gas service to 3000 psi
- Design permits throttling

900 SERIES

Send for information today..... ☐

OTHER CIRCLE SEAL VALVES

• Check Valves • Ball Valves • Butterfly Valves



Representatives in Principal Cities.

**SEAL** precision valves

**JAMES POND CLARK**

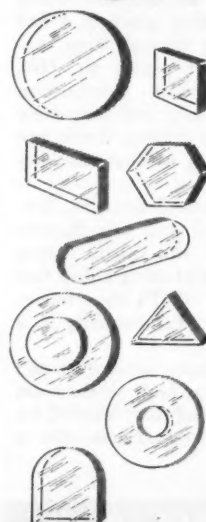
2181 East Foothill Boulevard, Pasadena 8, California

When inquiring check CP 6496 opposite last page

## Call SWIFT for

## SIGHT GLASSES

precision-ground in perfectly true circles



Let us supply you with Perfectly True Circles precision-ground from heat-resistant Pyrex Polished Plate Glass . . . used by major chemical companies from coast to coast. Resist clouding, pitting, chemicals (except HF and strong hot caustic solutions).

We can deliver immediately specially cut round, square, rectangle or odd-shaped Sight Glasses in 8 thicknesses (1/8" to 1"), sizes up to 24" x 60". Write, wire or phone for quotation. Ask for Sight Glass Bulletin.

## SWIFT Glass Division

SWIFT LUBRICATOR COMPANY, INC., ELMIRA, N.Y.  
330 Tenth St., San Francisco 3 • 140 Boylston St., Boston 16  
807 Matno St., Los Angeles

When inquiring check CP 6497 opposite last page

CHEMICAL PROCESSING

Single takes on ma

Uses: material

Features: brake is Self-cent both sh is worn armatur and ind

Descript of Iron standar 10-, 13-

Design install be chan bly. WH turbing be repla (DC m) trol Dep Road, S tion che page.)

Texas g

What is the worl field for Dow's F 73% cau chemical tons. Ins (Graver

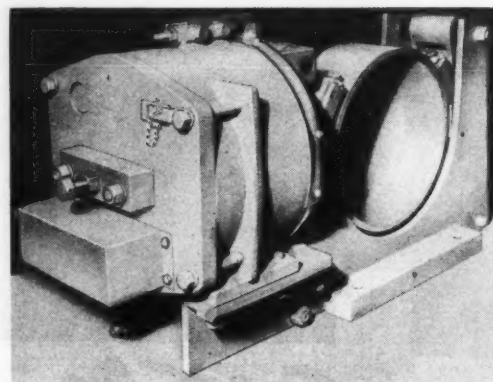


**Single-point adjustment  
takes care of wear  
on magnet brake**

**Uses:** For heavy-duty applications in mill drives, materials handling, marine service.

**Features:** A single adjustment at one end of brake is all that is needed to take care of lining wear. Self-centering fulcrum automatically compensates both shoes during adjustment, even if one lining is worn down more than the other. Visible gage, armature gap indicator, shows normal gap position and indicates when brake should be adjusted.

**Description:** DC magnet brakes meet Association of Iron and Steel Engineers' DC mill motor brake standard No. 11. Line of units covers standard's 8-, 10-, 13-, 16-, 19-, and 23-inch diameter wheels.



Brake meets AISE standard No. 11

Design features of unit reduce maintenance and make installation easy. Self-contained strongbox coil can be changed without removing whole magnet assembly. Wheel can be removed from top without disturbing any other adjustments, and shoe linings can be replaced without removing brake shoe assembly.

(DC magnet brakes are products of Industrial Control Dept., General Electric Co., Dept. CP, One River Road, Schenectady 5, N. Y. . . or for more information check CP 6498 on handy form opposite last page.)

★ ★ ★

"THAT'S INTERESTING"

Texas gets another "largest"

What is reported to be the largest nickel-clad storage tank in the world (70' diam x 40' high) has been erected in the field for Dow Chemical Co. at Freeport, Texas. Located at Dow's Freeport Harbor docksite, the tank is used to store 73% caustic soda solution preparatory to transferring the chemical to ocean-going vessels. It has a capacity of 8310 tons. Installation was made by Graver Tank Mfg. Co. (Graver Echo).

it's new!



## VANTON'S EXTERNAL BEARING X-B PUMP

without stuffing box, gaskets or valves

The Vanton corrosion resistant "flex-i-liner" self priming rotary type plastic pump is available in a new design that permanently protects all bearings from fumes or chemical attack.

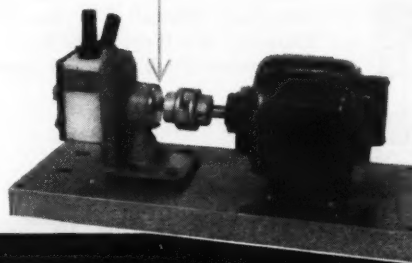
**Low maintenance** is assured since shaft bearings are external and the rotor assembly is stainless steel. The only wearing part is the quickly replaceable low cost flexible liner.

**Capacities range** from fractional to 5 gpm with 0-50 psi discharge pressures . . . Vanton XB will develop vacuum up to 26" Hg. and will handle corrosive liquids, gases, viscous fluids or abrasive slurries.

**The unique design** of the XB isolates the fluid from all actuating mechanisms or rotating parts. Pumping is accomplished by a rotor mounted on an eccentric shaft, creating a squeegee action on the fluid. Displacement is positive and non-agitating.

**Wide selection** of body block and liner materials makes Vanton XB suitable for an endless list of chemicals, pharmaceuticals and food products. Body blocks are available in: Bakelite, polyethylene, Lucite, Buna N, PVC, and stainless steel. Flexible liners are available in natural rubber, pure gum rubber, neoprene, Buna N, hycar, hypalon and silicone.

it's here



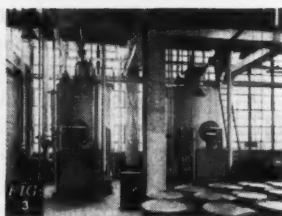
**VANTON PUMP & EQUIPMENT CORP.**  
Division of Cooper Alloy Corporation • HILLSIDE, N. J.

When inquiring check CP 6499 opposite last page

## what's phenolic resin production costing you?

If it's costing more than you think necessary, consult Brighton's creative engineering department. Brighton is solving cost problems for many large companies. Here is a major installation of Brighton Phenolic Resin Kettles now delivering efficient, low-cost production day in and day out.

On the balcony (Fig. 1) of this three-level arrangement, are stainless steel weigh tanks and stainless steel inclined condenser. Two Brighton steam-jacketed Phenolic Resin Kettles (Fig. 2) are installed on the main floor, and each has a capacity of 1500 gallons. They are fitted with anchor-type agitators. Construction in full accordance with ASME Unfired Pressure Vessel Code. Receivers for condensers are to rear of kettles, under balcony. Combination thinning and weigh tanks (Fig. 3) are below kettle floor and are connected to flush-type bottom outlets in kettle bottoms.



Brighton's engineering and design staff is fully prepared to answer your synthetic resin production problems by building equipment to your specifications.

Write today for specific information on Brighton Phenolic Resin Kettles. Dept. D



**BRIGHTON copper works inc.**

821 state ave. • cincinnati 4, ohio • grandview 4110  
designers and producers of chemical processing equipment

When inquiring check CP 6500 opposite last page

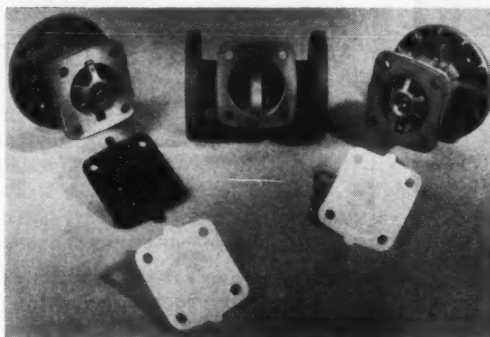
## ENGINEERING & MAINTENANCE

### High-temp service for valves made possible by Teflon diaphragms . . .

special compressor adapts standard Saunders unit for use with inert diaphragms

Higher temperature service with Saunders valves using chemically inert diaphragms is made possible with two Teflon diaphragms bearing company's designations R-1 and R-2. Diaphragms cover the range from minus 40 to plus 375°F.

R-1 diaphragms are of one-piece solid construction and can be used in the higher temperature range. They are built with a larger, more rugged floating tube nut to permit their use in vacuum service. A special compressor adapts standard Saunders diaphragm valve for use of R-1 Teflon diaphragms. It will be produced in 1" through 4" sizes.



Teflon diaphragms for Saunders valves

Where temperatures do not exceed 225°F and vacuums do not exceed 12 inches of mercury, R-2 diaphragms of two layer construction (consisting of a thinner Teflon diaphragm with a backing cushion) are available in all sizes from 1/2 to 6". R-2 combination is interchangeable with similar Kel-F combinations in valves which have been modified.

(Saunders valves with Teflon diaphragms are available from Grinnell Co., Inc., Dept. CP, 260 W. Exchange St., Providence, R. I. . . or for more information check CP 6501 opposite last page.)

### Uniform heat given contents of 55-gal drums by heater which snaps on . . .

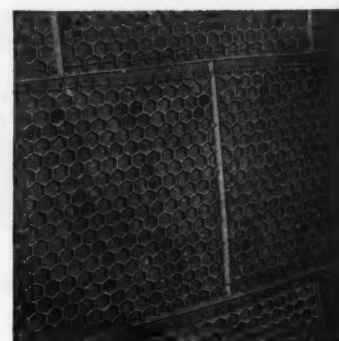
wax, grease, oil, other viscous liquids can be quickly melted or thinned

**Uses:** Melting or thinning viscous or solid contents of 55-gal steel shipping drums.

**Features:** Woven electric heaters are readily wrapped around and snap-fastened to drums. Light

## RIGHT WHERE IT COUNTS! IRVING "GRIDSTEEL" CONTOUR RETAINER MESH

Used with  
Castable Ganister Linings  
in Refracting Units  
in Petroleum  
& Chemical Industries



## RIGHT for

- ★ Thermal Cracking Units
- ★ Cyclones
- ★ Fluid Catalytic Regenerators
- ★ Fluid Catalytic Reactors
- ★ Hydroformers & Reactors
- ★ Flue-Gas Stacks & Ducts
- ★ Catalyst-Carrying Pipe Lines

## REDUCE EXPENSIVE SHUTDOWNS

by using  
Irving "GRIDSTEEL",  
the quality contour retainer mesh.

**IRVING SUBWAY  
GRATING CO., INC.**

ESTABLISHED 1902

OFFICES and PLANTS at

5050 27th St., Long Island City 1, N. Y.  
1850 10th St., Oakland 10, California

When inquiring check CP 6502  
opposite last page

CHEMICAL PROCESSING

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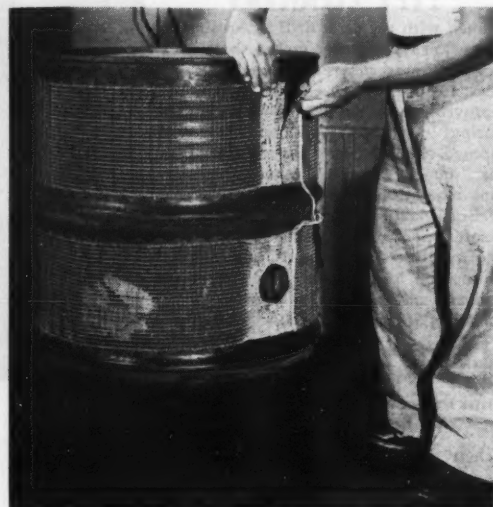
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in weight and fast-acting, snap-on heaters provide uniform heat by snug contact with drum surface.

**Description:** Standard construction of drum heater consists of alloy resistance wire, insulated with tough fibrous glass. With this insulation heaters can withstand 450°F sheath temperatures continuously. For heating acid or alkali compounds Teflon-insulated elements are available, and recommended to avoid damage from spillovers.



Heaters can withstand 450°F sheath temperatures continuously

Drum heater sections are wired together in pairs to fit between rings (or chimes). They are available in three standard ratings — 1500 or 3000 watts on 115 volts, or 3000 watts on 230 volts — complete with connecting cord and plug.

(Wrap-around heaters are products of Pre-Fab Heater Co., Dept. CP, Guilford, Conn. . . or for more information check CP 6503 on handy form opposite last page.)

#### Practical piping data

Piping flexibility, flow of fluids in pipes and pumping, and miscellaneous design data are the headings for sections in this 200-page book, which includes a wealth of practical data on piping. Tables, charts, and formulas appear in profusion. Of particular interest is a method for more rapid analysis of thermal stress and reactions in piping systems. An extensive bibliography and complete index are included.

"Practical Piping Flexibility — Design and Flow" is available at \$25 the copy direct from the author, W. A. Thomas, Consulting Engineer, Dept. CP, 2742 Philadelphia Ave., Pittsburgh 16, Pa.



it looked like a good deal...

But he found out that first cost  
isn't all you have to pay

Here's the "check" for  
one of our customers

During seven years an oil and chemical manufacturer purchased three LaBour Type G pumps. We've sold him \$556.22 worth of parts, for an average cost of \$46.30 per pump per year.

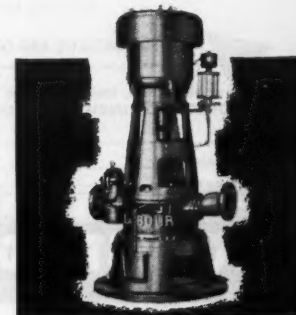
With chemical pumps as with so many things in life, first cost is an unreliable guide to ultimate cost. In fact, because chemical pumps are often subjected to severe service conditions, even the best of them may require substantial maintenance expense.

When you choose LaBour Type G you know you're going to come out with low total over-all costs, because LaBour Type G has been setting records for minimum service requirements in all sorts of applications. That's why we deliberately invite the most searching comparisons from your own records—and will help you get the facts together if you'll only consult us.

ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

# LABOUR

THE LABOUR COMPANY, INC. • ELKHART, INDIANA, U.S.A.



When inquiring check CP 6504 opposite last page

No. 4\* of ...

## 12 REASONS WHY YOU SHOULD BUY AND USE

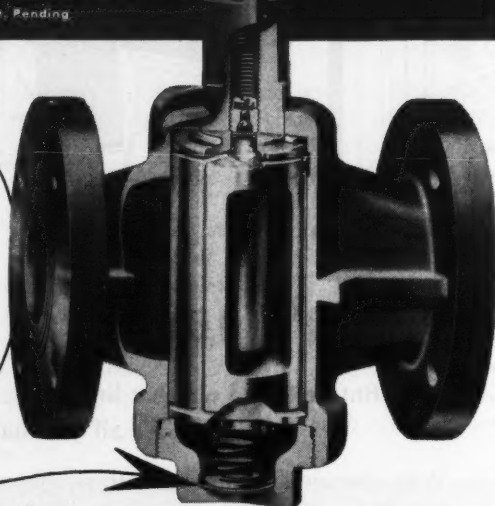
**LOW-PRICED**

# HOMESTEAD

*Lubricated*  
**PLUG VALVES**

Pat. Pending

**\*  
SPRING  
TORSIONAL  
STRESS  
RELIEVED BY  
TEFLON  
WASHER**



Low friction Teflon washer permits spring to turn with plug. This means that less maintenance and longer life are assured, because the spring is subjected to compression only.

This is only one reason why you should **BUY AND USE, low priced HOMESTEAD LUBRICATED PLUG VALVES.**

### HERE ARE ALL TWELVE

- |  |   |
|--|---|
| 1. Reinforced Teflon packing ring.                       | 7. Extremely close tolerance between sealing surfaces.        |
| 2. Completely controlled high-pressure lubricant system. | 8. Triple head-seal with Lubricant and Teflon packing ring.   |
| 3. 100% pipe area and venturi patterns.                  | 9. Plug floated on Teflon surfaces.                           |
| 4. No spring torsional stress.                           | 10. Leak-proof, double-ball-and-lubricant-sealed check valve. |
| 5. No mechanical adjustments.                            | 11. Full-threaded screw assures clean lubricant.              |
| 6. Two lubricants handle most services.                  | 12. Extruded lubricant shows a full protecting system.        |

**FOR CATALOG AND COMPLETE DETAILS MAIL COUPON TODAY**

Without obligation, send Reference Book 39—Section 5 on HOMESTEAD LUBRICATED PLUG VALVES.

NAME \_\_\_\_\_ TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_

**HOMESTEAD** VALVE MANUFACTURING COMPANY

Serving Since 1892

P. O. BOX 140

CORAOPOLIS, PA.

When inquiring check CP 6505 opposite last page

## MAINTENANCE

**Steel trap drains water  
from air, gas systems  
with no gas loss ...**

capacity is 2000 lb/hr  
@ 2000 psig

**Uses:** For draining water from compressed air or gas systems at pressures to 3000 psig where no gas loss is permissible.

**Features:** Trap has a non-collapsible, spring-balanced open float which normally holds valve closed by weight of water in bucket compressing spring. Entering condensate fills trap body adding buoyancy to float. Buoyancy plus spring compression then overcomes weight of water and bucket. Bucket floats, opening valve and allowing condensate to discharge. Water-sealed valve closes before all water is discharged.

**Description:** Capacity of condensate trap at 2000 psig is 2000 lb/hr. Working parts are stainless steel. Body and cap are ASTM F-5 chrome moly steel. Inlet connections are flanged, 1 or 1 1/4". Outlet connections are flanged or screwed, 1 or 1 1/4". Height is 15-7/8" ± 1/4"; diameter at flanges is 2 1/2".

(Condensate trap is a product of Armstrong Machine Works, Dept. CP, 881 Maple Ave., Three Rivers, Mich. . . . or for more information check CP 6506 opposite last page.)

### Stop scale formation electronically

Electronic water treatment units, which are galvanic (self-energizing) cells designed to condition water within boilers and heat transfer equipment, are described in four-page bulletin. What these units are and what they do is detailed along with their distinguishing features.

Bulletin on electromatic units is issued by Electromatic Water Treatment Inc., Dept. CP, 241 Church St., New York 13, N. Y. When inquiring specify CP 6507 opposite last page.

**with  
LAGONDA SUSPENSION  
TYPE CLEANERS**

Teamed with the right drill or brush, this suspension type cleaner makes short work of soft or hard deposits in small straight tubes. It can be air or electric driven. The improved motor has two ball-type thrust bearings for absorbing push and pull forces imposed on the cleaner during operation. The "squeeze" trigger control assures instant regulation from wide open to shut off. Brushes are available for light deposits in soft copper or brass tubes. Drills available are illustrated at right. For additional information, call your local Elliott Field Engineer, or write for bulletin to Elliott Company, Springfield, Ohio.

PK drill for light hard deposits

CT Carbide-Tipped drill for extremely hard heavy deposits

El Paso drill for light deposits in very small tubes

Drill Tip and adapter for soft gummy deposits

**ELLIOTT Company**

Y4-10

STEAM TURBINES • MOTORS • GENERATORS • DEHEATING HEATERS • EJECTORS • CONDENSERS  
CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

When inquiring check CP 6508 opposite last page

**TYPE T**

**A NEW ANGLE IN  
TEMPERATURE  
REGULATORS**

Same quality and superior workmanship of standard Keckley Temperature Regulators, but a new angle type to reduce installation and fittings cost—for mounting directly on heat exchangers, instant water heaters, etc., with top inlet connections.

The Type T, Angle Temperature Regulator has an overrun feature to protect thermal unit in case temperature at bulb exceeds range of regulator. All wearing parts of stainless steel are renewable. Body is of bronze or semi-steel. Available in 1/2" to 2" sizes with screwed connections, 2" to 8" with flanged connections. Sizes 1/2" to 4" are spring loaded, sizes 5" to 8" are weight loaded.

**Send for Data and Catalog 54-B**

**O. C. KECKLEY COMPANY**  
400 W. Madison St. • Chicago 6, Ill.

Pressure Regulators • Temperature Regulators • Float Valves • Strainers  
Solenoid Valves • Reducing Valves • Pop Safety Valves • Relief Valves

When inquiring check CP 6509 opposite last page

CHEMICAL PROCESSING



**Calcium silicate, 85% magnesia  
can be combined to supply  
added insulation value . . .**

calcium silicate alone makes efficient covering  
for pipes at temps to 1200°F

**Uses:** High-temperature pipe insulation applica-  
tions.

**Features:** Calcium silicate insulation alone gives  
efficient service on pipes at temperatures to 1200°F.  
Material is able to withstand these high temperatures  
without fusing, oxidizing, or materially changing  
shape.

This insulation has the added advantage of being  
able to be nested inside standard 85% magnesia. By  
combining the two insulations, low thermal conduc-  
tivity of 85% magnesia is added to value of high  
temperature calcium silicate.

**Description:** Calcium silicate pipe covering alone,  
or in combination with 85% magnesia, is available  
for all pipe sizes and thicknesses for which 85%  
magnesia is usually manufactured. Simplified material  
standards of prime sizes and thicknesses have also  
been developed by company to reduce number of  
sizes and thicknesses required for individual selection.

(Pipe insulations are a product of The Baldwin-Hill  
Company, Dept. CP, 881 Breunig Ave., Trenton,  
N. J. . . . or check CP 6510 opposite last page.)

**No two-part mixing required  
with adhesive whose bond  
improves with age . . .**

spreads easily, can be applied by brush, spray,  
or spatula

**Uses:** Adhesive applications with metals, other  
structural materials, natural and synthetic rubbers,  
glass, paper, canvas, and many plastic materials in-  
cluding polyester-glass laminates, rigid vinyls, and  
phenolic laminates.

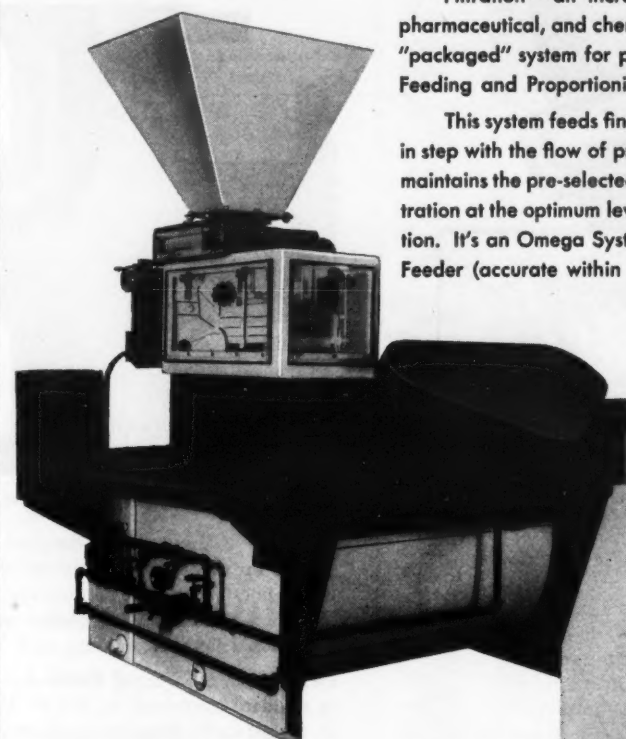
**Features:** No accelerators, catalysts, or two-part  
mixing are required to prepare adhesive. It spreads  
readily and can be easily applied by means of a  
spatula, brush, or spray equipment. Only good con-  
tact pressure is necessary to insure a strong bond.  
Strength of bond continues to improve with age.

**Description:** Neoprene Adhesive F-1 is not a  
vulcanizing adhesive. However, a cure does occur  
on aging, even at room temperature. Because of its  
strong, quick "grab", most assemblies made with  
material can be subjected to normal handling im-  
mediately after bond has been effected.

(Adhesive is a product of Adhesive Department,  
Carboline Company, Dept. CP, 331 Thornton Ave.,  
St. Louis 19, Mo. Check CP 6511 opposite last page.)

# SYNCHRONIZED Automatic System

FOR **CONTINUOUS** PREPARATION  
OF FILTER AID SLURRY

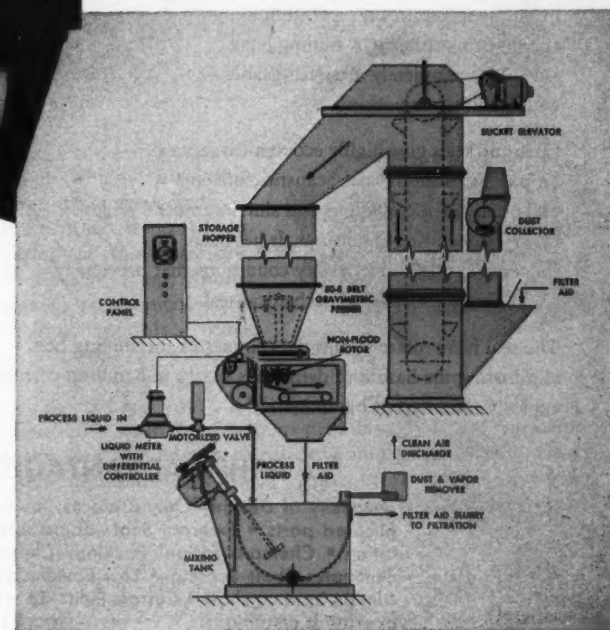


Omega Dry and Liquid Feeders fit into the  
widest range of continuous processing and blending  
operations. Tell us about your problems and we  
will gladly submit recommendations and quota-  
tions. Omega Machine Company (Division of  
B-I-F Industries, Inc.), 387D Harris Ave., Providence  
1, Rhode Island.

Continuous slurry preparation system including  
Omega 50-8 Belt Gravimetric Feeder with positive,  
non-flood feeding mechanism; mixing tank and  
agitators; dust collector, bucket elevator, storage  
hopper; control panel and differential controller.

Filtration — an increasingly important operation in the food, petroleum,  
pharmaceutical, and chemical industries — is put on a mechanized basis with this  
"packaged" system for preparing filter aid slurry . . . one of the many Omega  
Feeding and Proportioning Systems available to industry today.

This system feeds finely pulverized filter aid (weighing 7 to 15 lbs. per cu. ft.)  
in step with the flow of process liquid to the filters. A sensitive synchronizing unit  
maintains the pre-selected ratio of dry material to liquid . . . keeps slurry concen-  
tration at the optimum level . . . eliminates hit-or-miss, high-cost manual prepara-  
tion. It's an Omega System throughout — from the Model 50-8 Belt Gravimetric  
Feeder (accurate within  $\pm 1\%$  by weight) to the mixing tank, dust and vapor  
removal devices, synchronizing mechanism, and control panel. The design and construction of this  
"packaged" system is 100% an Omega responsi-  
bility which relieves the customer of the purchasing  
and engineering of individual components.



## OMEGA THE LAST WORD IN FEEDERS

DIVISION OF B-I-F INDUSTRIES, INC. BUILDERS IRON FOUNDRY • PROPORTIONERS, INC. • BUILDERS • PROVIDENCE, INC. **BIF** METERS FEEDERS CONTROLS

When inquiring check CP 6512 opposite last page

# NEW CHEMPRO SEAL INSTALLED IN ONLY 30 MINUTES



**NO SPECIAL  
HOLDING CLAMPS**  
**NO MACHINING  
OF STUFFING  
BOX FACES**

The new Chempro mechanical seal can be installed in only 20-30 minutes—it requires no special holding clamps or machining of stuffing box faces. It is completely interchangeable with stuffing box packing.

Chempro seals give highly economical service on pumps handling acids, caustics, solvents and other chemical liquids and slurries under a wide range of operating conditions. It has been successfully used under slurry conditions that previously could not be sealed by a mechanical seal.

The seal faces rotate within the confines of the stuffing box, eliminating the hazard of dangerous sprays in handling corrosive, toxic, explosive and flammable materials.

## OTHER ADVANTAGES

**Simplicity of Design—Only 8 pieces, involving no complicated parts • External Seal—adjustable after installation • Chempro Teflon® Packing—Chemically inert • Eliminates Shaft Scoring • Low Power Costs—Minimum friction load on shaft • Custom Built—To meet particular operating conditions.**

For complete details write for new Bulletin CP551.

\* Patented

\*du Pont's trademark for its tetrafluorethylene resin

**CHEMICAL & POWER PRODUCTS, INC.**  
The Original Fabricators of Teflon Packings and Gaskets

9 Broadway, New York 4, N. Y.

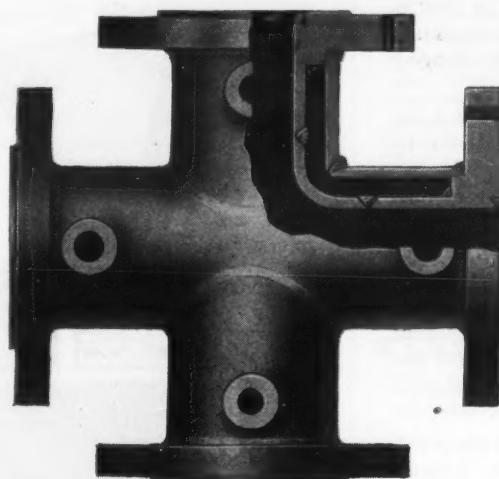
When inquiring check CP 6513 opposite last page

## ENGINEERING AND MAINTENANCE

**Seamless jacketed cross  
can be used with temps  
to 800°F . . .**

forged steel unit designed for applications where flow characteristics are major factor

**Uses:** In the chemical, petroleum, plastic, paper, and food industries where jacketed cross fittings are needed in high-temperature service.



Standard sizes of jacketed crosses are from 3/4 to 12"

**Features:** Fittings are designed for temperature service up to 800°F in standard sizes. Crossed for larger lines and higher temperature service are available on a custom basis. Pressures up to 300 psi can be handled without welding neck flanges.

**Description:** Forged steel jacket cross is produced in standard sizes from 3/4 to 12". Fitting is available in forged carbon steel and stainless steel, as well as in aluminum and other materials. This cross may be installed in any position. In addition to standard crosses, designs available include crosses of straight run sizes on the run with reducing branch outlets.

(Jacketed crosses are products of Jacketed Piping & Products Co., Dept. CP, 503 Columbia Bldg., Pittsburgh 22, Pa. . . or for more information reader may simply check CP 6514 on handy form opposite last page.)

**Maintenance almost eliminated  
with only one moving part  
in steam trap**

**Uses:** Steam trap applications in the range of pressures to 600 psi, temperatures to 905°F.

**Features:** Kinetic energy of steam closes valve in trap. Maintenance-free service is based on operating principle which permits simple design. Only

**FASTER,  
EASIER,  
MORE  
EFFICIENT  
CLEANING...**

for **2 1/2 cents**  
per gallon

Whether the job calls for cleaning heavy duty tanks of metal, plastic and glass lined, or cleaning general equipment, Alconox combines power with the gentleness that spells **SAFELY CLEAN.**

Compounded from numerous different chemicals Alconox is blended into a fast acting multiple cleaning detergent that meets your cleaning needs every time—and at 2 1/2 cents per gallon.

Used by leading industrial firms who found it better for such varied uses as cleaning ball bearing assemblies, optical lenses and industrial glass piping systems, after recommendations by their own research departments.

**ALCONOX** outsells  
because  
it outperforms

Literature, Samples and the name of your nearest distributor upon request.

For specific problems write or call our Technical Department

AVAILABLE IN

BOX of 3 lb. . . . \$ 1.95  
CARTON of 12 boxes of 3 lb. . . 18.00  
DRUM of 25 lbs. . . . . lb. .43  
DRUM of 50 lbs. . . . . lb. .40  
DRUM of 100 lbs. . . . . lb. .40  
DRUM of 300 lbs. . . . . lb. .37

(Slightly higher on Pacific Coast)

ALCONOX, INC., 61-63 Cornillon Ave., Jersey City 4, N. J.

When inquiring check CP 6515 opposite last page

CHEMICAL PROCESSING



moving  
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moving part in trap is valve head, a solid heat-treated stainless steel disc. Same head and seat are used for all pressures and temperatures within trap's range.

**Description:** In operation steam trap closes tight on no load, and operates against a back pressure up to 50% of its inlet pressure. It discharges condensate at saturated steam temperature as rapidly as it forms. Trap can vent large volumes of both air and air-steam mixtures. Starting load capacity is high, but it operates equally well with light loads or no load. It is not affected by pressure variations. Design and metals used enable trap to withstand superheat, water-hammer, vibration, and corrosion.

Unit is extremely compact: 1" size is only  $3\frac{1}{2}$  x  $4\frac{3}{4}$  x 4" high. Bodies are of cast semi-steel, carbon or moly steel with screwed, socket weld, or flanged connections.

(Thermodynamic steam traps are products of Sarco Company, Inc., Dept. CP, Empire State Bldg., New York 1, N. Y. Check CP 6516 opposite last page.)

After you've read an article,  
do you often . . .

### Want More Information?

Ever read a magazine article and think — "Now there's something I'd like to know a little more about?"

Probably you have . . . because no matter how long the article, it can't tell you everything. But how do you get more information? Perhaps the magazine didn't tell you . . . and you're too busy to hunt here and there for a name and address . . . a source of further information. So — maybe a good, profitable idea is not followed up, not put into practice in your operations.

When you read CHEMICAL PROCESSING you come to no such "dead ends." Every article has been selected as worthy of your valuable reading time . . . the non-essentials have been edited out . . . brief, factual material remains . . . AND, at the end of every article a "source" paragraph tells you where to get more information.

Convenient for you . . . and NOTHING MISSING. Remember, the manufacturer's name and address along with a "key number" at the end of an article is there as an editorial service for you. (Did you wonder, "Is this a new form of advertising?") That information is added to each story by the editors to help you, the reader.

THE EDITORS

the **NATURAL**  
way  
to get  
**UNNATURALLY**  
low  
pressures

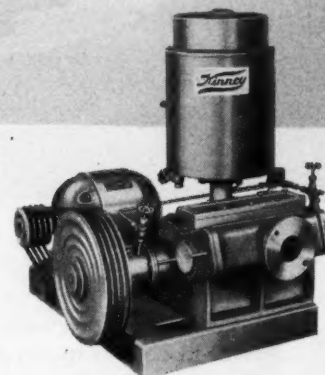
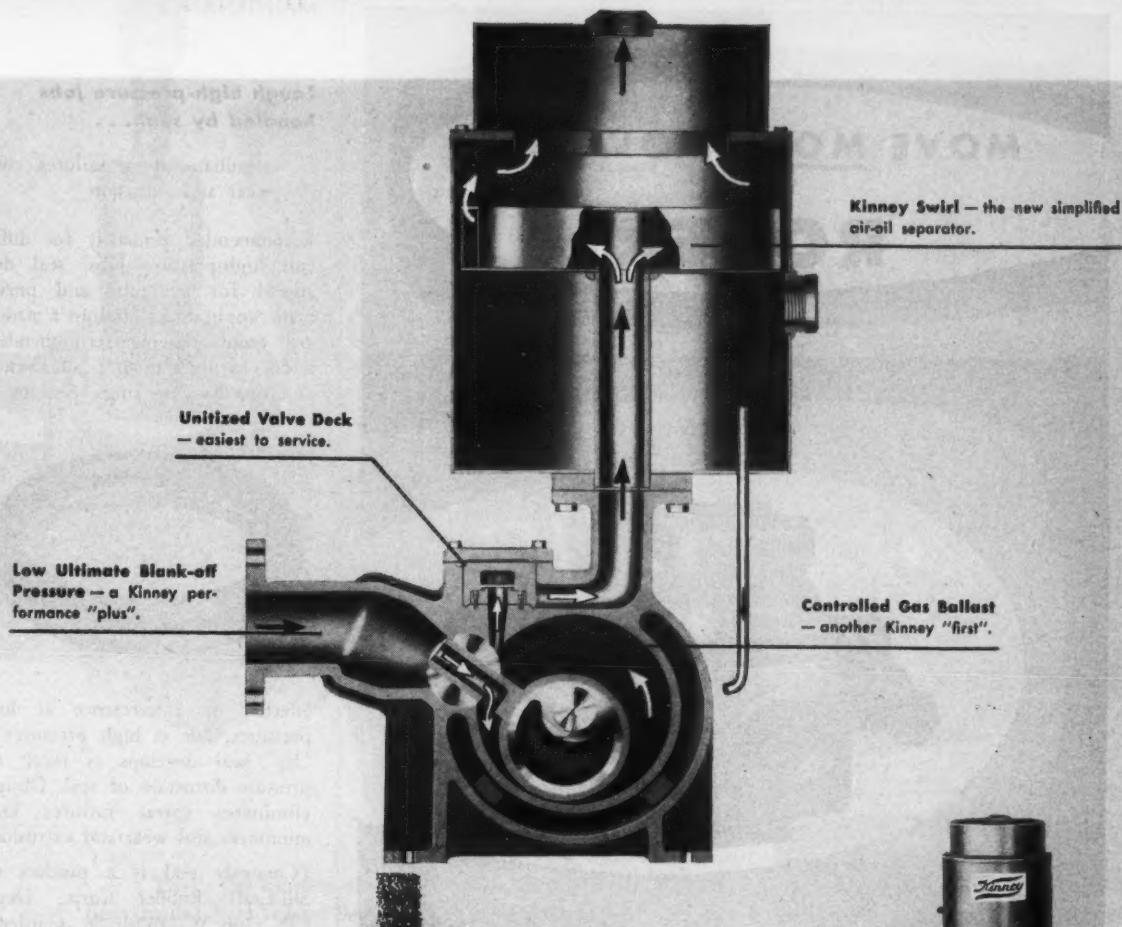


**KINNEY** MFG. DIVISION  
THE NEW YORK AIR BRAKE COMPANY  
3573 WASHINGTON STREET • BOSTON 30 • MASS.

- ☐ Please send Bulletin V54 describing the complete line of Kinney Vacuum Pumps.
- ☐ Our vacuum problem involves \_\_\_\_\_

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

When inquiring check CP 6517 opposite last page



More and more companies are coming to Kinney with their vacuum problems every day — it's the natural thing to do. Originator of the cam and piston vacuum pump, Kinney offers more mechanical vacuum pump models, more answers to the water-vapor problem, and more highly specialized vacuum experience and knowledge to help you. SEND COUPON FOR DETAILS . . . or tell us about your own vacuum problems. Consult the competent vacuum engineers in our district offices — in Boston, New York, Philadelphia, Cleveland, Chicago, and Los Angeles. Kinney Manufacturing Division, Boston 30, Massachusetts.

## MOVE MORE MOLASSES WITH A ROPER



For dependable pumping at slow speeds you can count on Roper Series 3600 Pumps to do the job. The pump shown is tailored for moving molasses, liquid sugar, and the like . . . its special gear tooth design and large displacement afford optimum performance through countless hours of running time. Investigate Roper as the practical approach to your situation. It will pay off in the long run. Roper Series 3600 Pumps are available in sizes 40 to 300 G.P.M.; pressures to 60 P.S.I.



**GEO. D. ROPER CORPORATION**  
744 BLACKHAWK PARK AVE., ROCKFORD, ILL.

When inquiring check CP 6518 opposite last page

## MAINTENANCE

### Tough high-pressure jobs handled by seal . . .

eliminates spiral failures, cuts wear and extrusion

Recommended primarily for difficult high-pressure jobs, seal designed for hydraulic and pneumatic applications fits into a standard groove having recommended width to accommodate an O-ring and two back-up rings. Sealing is



effected by interference at low pressures, but at high pressures a "lip" seal develops as result of pressure distortion of seal. Design eliminates spiral failures and minimizes seal wear and extrusion.

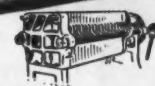
(Connealy seal is a product of Sili-Craft Rubber Corp., Dept. CP, 1700 W. 135th St., Gardena, Calif. . . . or for more information check CP 6519 on handy form opposite last page.)

### Data on turbocharging of two-cycle engines

Lower installation cost, less fuel consumption, and less cooling are among the advantages claimed for gas-engine driven, turbocharged compressors described in 22-page bulletin. Dimensions and specifications of units are tabulated and design features are discussed. Photos and cutaway drawings illustrate text.

Bul 134 is available from Clark Bros. Co., Division, "One of the Dresser Industries," Dept. CP, Lincoln Ave. & 5th St., Olean, N. Y. When inquiring reader may simply specify CP 6520 on handy form opposite last page.

## SPERRY



### CUSTOM FILTRATION AT ITS FINEST!

The right size . . . the right capacity . . . the right material . . . the right feed. That's Sperry Plate Filter Presses. As right for you as profit itself! Each Sperry installation carries the advantages of low cost and maximum clarity in a design custom-engineered for your specific requirements.

Write for a free copy of the brand-new Sperry Catalog. A complete handbook of facts, figures, and photos about filtration. Write today!



**D. R. SPERRY & CO., BATAVIA, ILL.**

Filtration Engineers for Over 50 Years

Eastern Sales Rep:  
George S. Tarbox  
808 Nepporham Ave.  
Yonkers 3, N. Y.  
Yonkers 5-8400

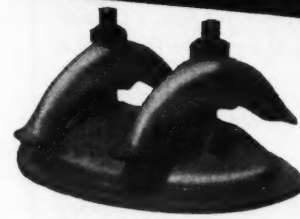
**SPERRY  
FILTER PRESSES**

Western Sales Rep:  
R. M. Pithers  
833 Merch. Exch. Bldg.  
San Francisco 4, Calif.  
SF 3-8375

When inquiring check CP 6521 opposite last page

## LENAPE

### MANWAYS and FITTINGS



11 x 15" N Fitting.

### A wide variety of access openings.

Lenape elliptical access openings (straight rings or flued and curved saddles) and fittings, of the pressure loaded or "self-energized" type are produced in sizes ranging from 4" x 6" to 18" x 24".

### Typical Lenape Fittings

- 11 x 15" Type L 150 PSI in steel, Everdur, and 304 Stainless.
- 11 x 15" Type N 450 PSI for general application.
- 11 x 15" Type S 250 PSI with external split recessed clamp plate for paper machine dryers
- 12 x 16" Type N 450 PSI for general application.
- 12 x 16" Type HP 800 PSI for heavy duty.
- 14 x 18" 300 PSI Hinged for beverage tanks.
- 18 x 24" 200 PSI for large clean-outs.

Full details are found on pages 42 to 49 of Lenape Catalog 10-53.



**LENAPE HYDRAULIC PRESSING & FORGING CO.**  
DEPT. 100 WEST CHESTER, PA.  
RED MAN PRODUCTS

When inquiring check CP 6522 opposite last page

CHEMICAL PROCESSING



### Enables immediate conversion from cold to hot spray painting

Immediate conversion of existing high-pressure cold paint spray systems to hot volume air spraying, at controlled temperatures of air and heat between 80 and 250°F, may be made by merely attaching standard high-pressure air and paint hoses to heater unit. Heat, replacing thinner as the viscosity reducing agent, enables spraying of paint at its original consistency. This gives one coat coverage, reduces labor and paint costs, and eliminates thinner costs. Hot application allows painting at lower ambient temperature and higher humidity. Unit may be used at any distance from paint and air source.



Heater unit controls temps of air and heat between 80 and 250°F

With this hot spray method, air at negligible pressure is used, eliminating chilling effect of decompression of high-pressure air at gun nozzle. Atomization of paint by air volume instead of air pressure results in economies in paint costs by eliminating backspray and offspray, and enables indoor paint spraying without masks, goggles, or spray booths.

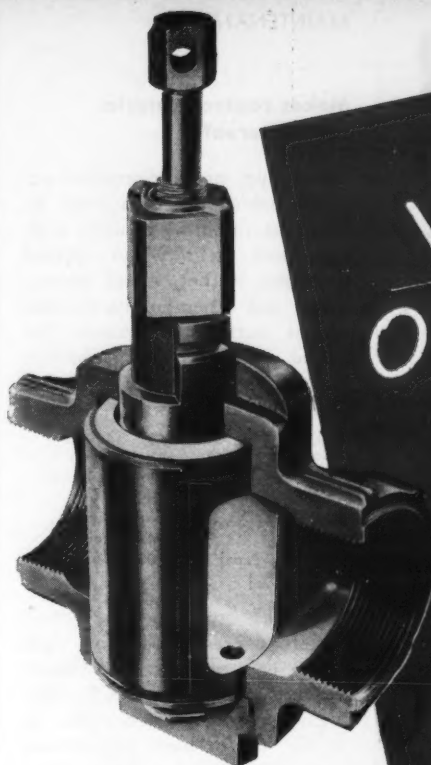
Spray gun used with heater unit is company's standard gun, which handles all paints, varnishes, lacquers, or enamels with one nozzle, which allows internal or external atomization.

(Model V.950 ThermoVolumaire hot spray unit is a product of Roxon, Inc., Dept. CP, 50 Broad Street, New York 4, N.Y. Check CP 6523 opposite last pg.)

### Takes less than 1/5 space required by sand filter

Filtered water of extreme clarity is said to be provided by diatomite filter unit described in four-page bulletin. Advantage of unit is that it takes only 1/5 the floor space required for a sand filter of equal output.

Bul 801 is available from Elgin-Refinite, Div. of Elgin Softener Corp., Dept. CP, 180 N. Grove Ave., Elgin, Ill. When inquiring specify CP 6524 on handy form opposite last page.



VALVE  
OPENING  
equals  
PIPE  
OPENING

4" valve  
port  
area—  
12.75sq.in.

4" pipe  
area—  
12.73sq.in.

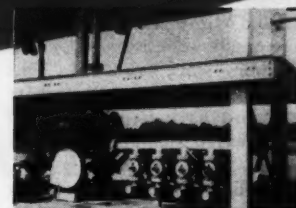
That's the formula of success behind **Q C f** Rectangular Port Valves! Because they have a port area at least equal to the pipe itself... turbulence and loss of head pressure are held to a minimum... even when handling heavy slurries and other viscous ladings.

All **Q C f** Cylindrical Lubricated Plug Valves... both those with rectangular and round port openings... feature split-second, quarter-turn shut off that meets the rigid control requirements in the petroleum, natural gas, and processing industries. Maintenance is especially low because they are fitted with TEFLON® gaskets to prevent head leakage, and have no line seats exposed to fluid flow.

### ACT NOW TO KEEP DOWN VALVE MAINTENANCE COSTS!

Representatives in 50 Principal Cities. Write for Descriptive Catalog 5-CP, **Q C f** Industries, Incorporated, Valve Division, 1501 E. Ferry Avenue, Detroit 11, Mich.

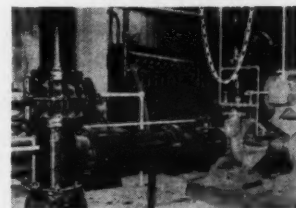
\*DuPont Tradename



On Petroleum Applications



In Chemical Plants



In Sewage Treatment

**Q C f**



**PLUG VALVES**

When inquiring check CP 6525 opposite last page

# PURE PLANT WATER

## is the answer to many production problems

Depleted water supplies and a consequent degenerating quality of water has caused much concern in industry. Even a small quantity of silica sand or organic impurities in water causes increased maintenance costs and reduces the quality of many products.

### Some examples

One firm's problem was the breakage of their welding tips. The welding tips would become burned, turn brittle, and then break. Dirt in the cooling water was suspected, and Sparkler diatomite filters were put on the job. The life of the welding tips was extended eight to ten times by the use of filtered water.

Another firm has produced an off-white chemical for many years. Their source of water is a highly colored river which is heavily contaminated with industrial wastes. Sand filters had been used for many years but the product always carried a color trace from the raw water. When it was decided to improve the product's color, two 400 sq. ft. Sparkler diatomite filters were installed. This firm now produces a true-white chemical and have been rewarded by an increased demand for their product.

A third firm obtain their water from deep wells. The water, while fairly clear, contained a definite amount of very fine sand. This sand caused excessive wear in high head pumps and clogged fine fog nozzles interrupting production and increasing maintenance costs. Sparkler diatomite filters were installed on this four-million-gallon-a-day applica-

tion and completely removed the above troubles.

The low initial cost of diatomite filters combined with their low floor space requirement and ease of operation have proved very attractive to industry. The diatomite filter will remove all silica sand, algae, organic matter and silt from water sources such as wells, rivers, or lakes. Bacteria is reduced 80% or even more in some cases. The quality of filtered water is always constant, no deterioration or variation is encountered. Add to the above that one filter can be cleaned with the output of a second filter, which eliminates the need for oversize pumps or large holding tanks for filtered water, and the reasons for the interest in diatomite filters are quite apparent.

The Sparkler Model SCJ diatomite filter is designed specifically for large volume water filtration. Available in sizes up to 2000 sq. ft. of filtering surface with capacities up to 5,000,000 gal. per day in a single unit. Multiple units engineered for larger requirements.

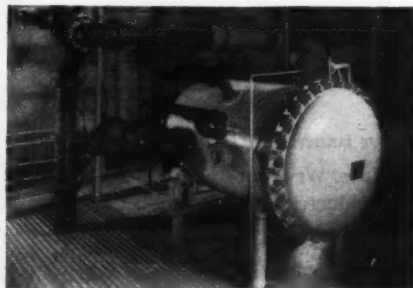
The original cost of a Sparkler diatomite filter is about 2/3 that of a sand filter and the floor space required less than 1/2.

Write Mr. Don Baldwin for engineering service on your plant water problem.

Crystal clear water is obtained from a pond for plant use at Trent Tube Co. with this Sparkler Model SCJ diatomite filter. Flow rate 1,152,000 gallons per 24 hr. day operation from this single filter unit.

**SPARKLER MFG. COMPANY**  
Mundelein, Illinois

Sparkler International Ltd.  
Plants at: Galt, Ontario, Canada  
Amsterdam, Holland



Sparkler Manufacturing Co., Mundelein, Illinois

☐ Have engineering representative call for consultation on our water problem. ☐ Mail plant water filtering bulletin.

Company \_\_\_\_\_

Address \_\_\_\_\_

Individual to contact \_\_\_\_\_

When inquiring check CP 6526 opposite last page

## MAINTENANCE

**Makes coated material self-adherent**

Fast-drying, pressure-sensitive adhesive, which can be applied by brush or machine, exhibits high aggressive tack. When applied to paper, leather, metal, plastic, wood, and other porous or non-porous surfaces, it makes the coated material self-adherent. General properties of this adhesive are as follows:

Composition	Saturated high polymeric plastic Clear
Color	Aliphatic and aromatic solvents
Vehicle	150,000
Viscosity (cps)	55
Solids (%)	Neutral
Odor	

(Prestix pressure-sensitive adhesive is a product of Adhesive Products Corp., Dept. CP, 1660 Boone Ave., New York 60, N. Y. . . . or for more information check CP 6527 on handy form opposite last page.)

### Determines savings in boiler blowdown

Rapid calculations of savings possible through heat recovery with a properly-sized automatic continuous blowdown system is possible with simplified chart. Incident to savings determination is rate of boiler blowdown for water conditions and selection of correctly-sized heat exchanger.

Recommendations for selection of company's blowdown equipment in accordance with normal operating conditions of boiler installation are given. Extraction of maximum amount of heat in the blowdown by means of heat exchangers is shown to be most economical method in most cases.

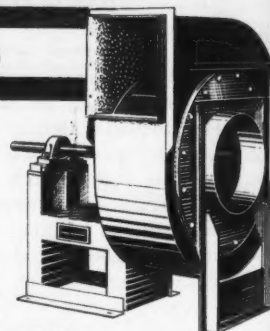
Chart to determine savings and size of continuous blowdown system is available from Henszey Company, Dept. CP, Water St., Watertown, Wis. When inquiring reader may simply specify CP 6528 on handy form opposite last page.

# NOW from DRACCO!

**performance proved**

**industrial fans**

- For All Air Handling Jobs
- General ventilation
  - Dust collection
  - Fume and high temperature exhaust work
  - Conveying refuse, shavings, stringy materials



Dracco Industrial Fans—"Performance Proved" by 15 years' use with Dracco Dust Control systems—give longer, trouble-free service. Superior construction—welded, vibration-free, all steel elements, no castings to crack, precisely balanced, Rotation and discharge adjustable. Wide range of sizes—inlet diameters 11"-38", pressures to 17" S.P., volumes from 500-46,000 CFM. For better performance, specify Dracco Fans. For details, contact:



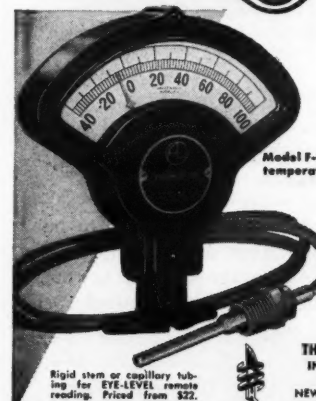
Write for 40-page Dracco Fan Bulletin No. 601 containing complete performance data and specifications.

**DRACCO CORPORATION**  
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When inquiring check CP 6529 opposite last page

## Depend on AUTO-LITE for Temperature Indication

You Benefit from  Eye-Level Readings



3-way adjustable mounting

Model F-1 temperature indicator

Auto-Lite offers many thermometer styles, permitting plant-wide temperature observation at low cost. Standard temperature ranges from minus 60°F to plus 750°F. Send for latest catalog showing various types.

THE ELECTRIC AUTO-LITE COMPANY  
INSTRUMENT AND GAUGE DIVISION  
TOLEDO 1, OHIO  
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TEMPERATURE INDICATORS & RECORDERS

When inquiring check CP 6530 opposite last page

CHEMICAL PROCESSING

Water pump displace

Uses: cations, gpm t. Features: to high action liquids. Units: Only may Water

Descri: ciple, um d cavity) housin dischar Ports: is spre velocit pellers with n tion. with n ties at Pumps: pumpe source. or vap (Positi of Lin Jeffers CP 65



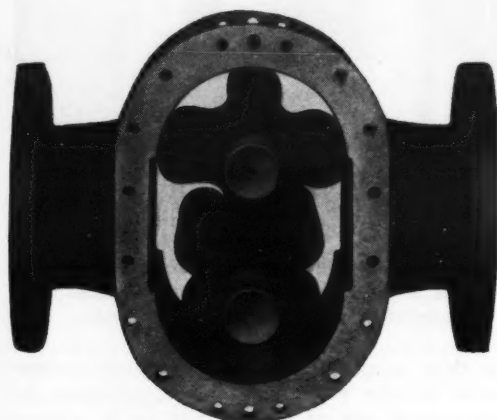
**Water or highly viscous liquids pumped efficiently by positive displacement units . . .**

capacities to 2200 gpm, pressures to 1000 psi handled by range of sizes

**Uses:** General industrial liquid-handling applications requiring a pump with capacities to 2200 gpm to handle pressures to 1000 psi.

**Features:** Pumps will handle liquids from water to high viscosity fluids and solids up to 78%. Pump action will not break up semi-solids or aerate liquids.

Units have no valves to stick or pistons to gum up. Only parts subject to wear are impellers, which may be replaced rapidly without breaking lines. Water or other liquids keep impellers lubricated.



End view of pump with rubber impellers exposed

**Description:** Under positive displacement principle, unmeshing of rubber impellers produces a vacuum drawing liquid into space between lobes (lobe cavity). Liquid is carried between lobes and case housing to opposite side of pump and forced into discharge line.

Ports of pump are shaped in such a way that liquid is spread across full width of impellers and liquid velocity is coordinated with speed of pumping impellers. This causes liquid to pass through pump with minimum energy loss from turbulence and friction. Design provides quietness and compactness with means for handling a wider range of viscosities at standard motor speeds.

Pumps can be installed above level of liquid to be pumped or at a considerable distance from liquid source. They are self-priming and will not cavitate or vapor lock.

(Positive Displacement Rotary Pumps are products of Lindquist Pump Corp., Dept. CP, 10001 W. Jefferson Blvd., Culver City 12, Calif. . . . or check CP 6531 on handy form opposite last page.)



## easy to install . . .

"Easy as putting in a pipe fitting"—that's what it's like to install a Yarway Impulse Steam Trap.

No special supports needed, because Yarways are light in weight, small in size—can be squeezed in most anywhere.

Plus these good features:

- **They get equipment hot in a hurry and keep it hot**
- **Good for all pressures**
- **Six standard sizes, 1/2" to 2"**
- **Long life...body and working parts are stainless steel**
- **Low maintenance . . . only one moving part**
- **Corrosion resistant, non-freezing**

Everywhere users are calling the Yarway Impulse "the little steam trap that does so much." Prove to yourself what it does by trying one for 60 days FREE in your own plant. Write . . .

**YARNALL-WARING COMPANY**  
125 Mermaid Avenue, Philadelphia 18, Pa.



## impulse® steam trap

OVER 1,000,000 YARWAYS ALREADY SOLD THROUGH 250 CONVENIENT INDUSTRIAL DISTRIBUTORS

When inquiring check CP 6532 opposite last page

# BRIDGEPORT BRASS COMPANY

## CONDENSER AND HEAT EXCHANGER TUBE EDITION

# COPPER ALLOY BULLETIN

BRIDGEPORT  
CO.

MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND. — IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



Retubing a condenser with Bridgeport Condenser Tubes.

## Condenser Tube Care Starts with Good Storage Practices

Stocking condenser tubes to facilitate repairs and minimize down-time is a practice which results in tangible operating and maintenance economies. However, proper methods of storage and handling are fundamental to long life and satisfactory performance from such replacements.

If you're not getting superior performance or long service from your replacement tubes, despite approved installation and operating practices, chances are that the tubes may have suffered damage prior to installation.

### Proper Storage Techniques

1) Tubes should be stored flat and in original shipping cases. Low stacks of cases are recommended to prevent damage to bottom tubes from excessive weight.

2) Storage locations should be both dry and protected, since extremes of temperature and humidity are detrimental. If necessary, storage areas should be dehumidified, using standard equipment readily available for this purpose.

3) Avoid outdoor storage where corrosive fumes, soot, smoke, dirt and dampness can attack tubing surfaces.

4) Water-soaked cases or tubes require immediate drying out.

5) When stored in racks, tubes should

be supported at several points to prevent distortion from their own weight.

### Manufacturer's Precautions against Damage

Bridgeport has realized the necessity for protecting its products against damage in transit, and from improper handling and storage after arrival at destination. For this reason, Bridgeport Condenser Tubes are shipped in cases of time-tested design, assuring their arrival in perfect condition. Their care, on receipt, becomes the responsibility of maintenance personnel. By maintaining proper storage requirements, as outlined above, tubes will remain undamaged. Since tubes often are stored for months, and occasionally for years, deviations from recommended methods may have serious effects.

However, observance of the best storage practices is worthless if improper or rough handling is permitted. Workmen should not walk on tubes. Such treatment may result in dents, digs, nicks, bends, twists or other distortions, all of which may predispose the tube to early failure under some conditions of service.

### Effects of Improper Storage

As indicated, inside storage is preferred, but it offers no benefits to condenser tube protection if temperature

and humidity extremes are permitted to exist. Cases absorb moisture and transfer it to the tubes. For this reason, if cases are allowed to rest on moist ground or wet floors, the contents are apt to be damaged. Tubes inside packing cases collect condensed moisture, which in turn picks up corrosive elements from the atmosphere, with possible damaging effects. Furthermore, white, green, blue and black salts, as well as red and black oxides, form on tube areas in contact with walls of moisture-laden cases.

In outside storage, tubes and assorted tube bundles are subjected to the full effect of atmospheric contaminants, such as dust, cinders, soot and corrosive gases. In addition, rain, snow, frost and dew accumulate on outside surfaces and tube ends. The combined action of moisture and atmospheric impurities has been found to result in damage to tubes, especially if storage under these conditions is prolonged.

Should outside storage be unavoidable, tubes should be covered by a tent or tarpaulin in tent form to protect them from weather and atmospheric deposits. In addition, vents should be provided at the tent peak to permit free circulation of air and promote evaporation of any interior moisture.

### Failure Prevention by Inspection

Prevention of operational failures resulting from tubes weakened by improper storage is a simple maintenance procedure. This may be accomplished by having experienced personnel make periodic examinations of tubes stored on the bottom of piles, or in damp areas, to determine the corrosion rate.

The best method, however, is careful handling of replacement tubes and their storage under correct conditions.

Available to all users of condenser and heat exchanger tubes are the services of Bridgeport's Technical Service and Research Laboratory to help with corrosion problems and to recommend the best condenser tube alloy for each application. You may also obtain a copy of Bridgeport's Condenser and Heat Exchanger Tube Handbook, which contains valuable data on tubing problems and solutions—write for it today.

(3329)

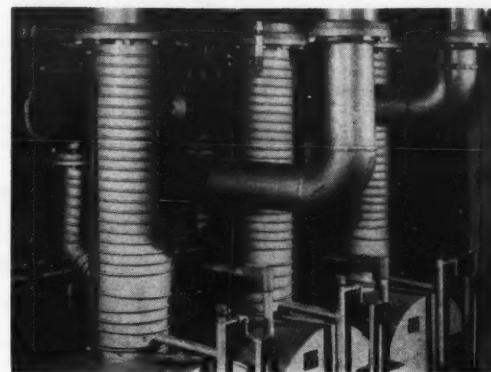
## ENGINEERING & MAINTENANCE

### Design gives increased capacity to diffusion, booster pumps . . .

ring of jets replaces jet cone permitting increase in air-flow path area

Uses: Low- or high-vacuum applications.

Features: Line of pumps is said to have greatly increased pumping capacity over critical pressure ranges. They will exhaust to substantially higher forepressures. For example, 16" diffusion pump will exhaust 11,000 cfm at a pressure of 1 micron; 6" booster pump will exhaust 760 cfm at 50 microns, 1400 cfm at 15 microns, with an ultimate pressure of .06 microns.



Three of the six 10" high-speed booster pumps installed on a 1000-lb vacuum-melting furnace

In these units, Ring-Jet design replaces conventional jet cone with a ring of jets, permitting the cross-section area of air-flow path to be substantially increased without increasing distance from beginning of each jet stream to nearest condensing surface. Thus, volume of air that can be passed through pump, and hence its pumping speed, is considerably increased.

Description: Diffusion pump is available in 4, 6, 10, 14, and 16" sizes. Booster pump is available in 4, 6, 10, and 16" sizes.

(Diffusion and booster pumps are products of F. J. Stokes Machine Co., Dept. CP, 5500 Tabor Road, Philadelphia 20, Pa. . . or for more information check CP 6534 on handy form opposite last page.)

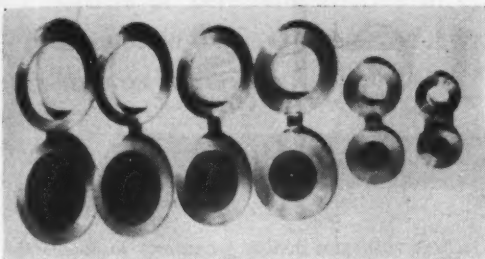
### Figure 8 cutoff flanges available in any size in carbon steel or alloy to meet specs

Uses: On pipelines which are closed off infrequently and where gate valves are not needed.

Features: Flanges can be supplied by company in any size in carbon steel or alloy to satisfy the customer's particular specifications.

When inquiring check CP 6533 opposite last page





Part of flange not in use shows whether line is open or closed

**Description:** Figure eight cutoff flange is made in two sections, a disc and a ring, and joined by welding. They are machines for good gasket seating or may be supplied for ring joints. That part of flange not in use is exposed giving instantaneous signal to line men showing whether the line is open or closed.

(Cutoff flanges are products of H. F. Butler, Inc., Dept. CP, P. O. Box 121-24, Union, N. J. . . . or check CP 6535 on handy form opposite last page.)

#### **Describes mineral-insulated heater units**

Electric heater which makes use of copper-sheathed, mineral-insulated resistance cable is described in eight-page bulletin. Background, application, and performance characteristics of the heater units are presented. Charts, tables, and drawings accompany text.

Bul 1603 is available from Nelson Electric Manufacturing Company, Dept. CP, 217 N. Detroit, Tulsa, Okla. When inquiring specify CP 6536 on handy form opposite last page.



#### **Your guide to more ideas concerning Engineering and Maintenance . . .**

is the handy Product Directory on pages 237 to 240. All products and services discussed in this issue, in either editorial or advertising, are listed there.

**BACK IN THE 1880's**

**WHEN MALTED MILK WAS FIRST INTRODUCED**



## **Koven**

**WAS MAKING INDIVIDUALIZED CHEMICAL EQUIPMENT**

Good news travels quickly—and only a few short years after its introduction, malted milk had become one of our favorite national refreshments. Yet—even before the first malted milk tablet was enjoyed—word-of-mouth recommendations by chemical manufacturers had already established KOVEN as one of America's foremost steel fabricators. For over 70 years now, leading chemical plants have been achieving faster, more economical output with efficient KOVEN Individualized Equipment—built to their exact needs. See how KOVEN's accumulated skills and vast resources can help you in your race against time and costs. Call or write for a consultation—no obligation. Send for Bulletin #550.



Hose Vulcanizer

#### **X-RAY INSPECTION FOR QUALITY CONTROL**

KOVEN equipment in all metals and alloys include: High pressure vessels, extractors, mixers, stills, kettles, tanks, stacks, breechings. Shop and field erected storage tanks. High vacuum testing.

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#### **Specialists in:**

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Fabrication to all A.S.M.E. Codes

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Steam jacketed mixing kettle made of steel.

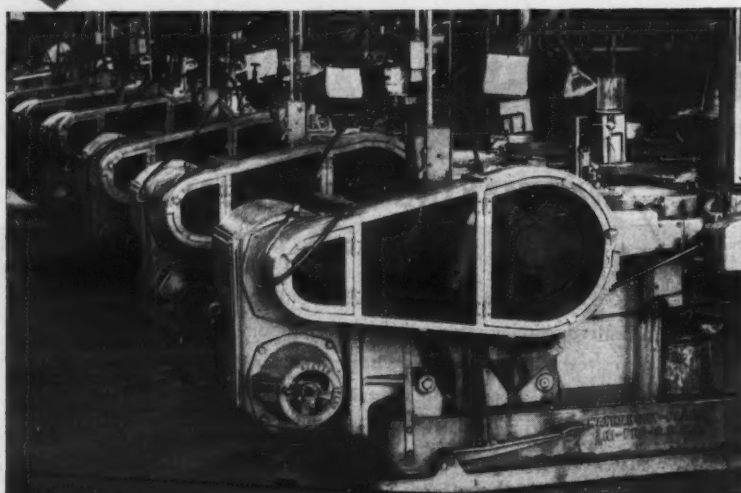


**KOVEN FOR INDIVIDUALIZED EQUIPMENT SINCE 1881**

When inquiring check CP 6537 opposite last page



REEVES Vari-Speed Motodrives provide the exact speeds required for maximum production and efficiency on this bank of six Waterbury-Farrel cold heading machine installation in the P. R. Mallory plant in Indianapolis.



Your machines will produce  
more at less cost with—

**REEVES**  
Variable Speed Control

● Whether your production problems involve manual or *auto-matic operation* . . . REEVES complete line of Variable Speed Drives and Controls will deliver the exact speed required for each operation, each operator, under every changing condition of method or material. REEVES Speed Control is positive and accurate to a fraction of an RPM.

Let a REEVES Speed Control Engineer show you how you can make your machines . . . your operations . . . more efficient, more economical, more profitable—*now!* Write today for complete details. Specify CP16a-L.

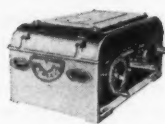
**Only REEVES offers you a complete line of  
Variable Speed Drives and Automatic Controls!**



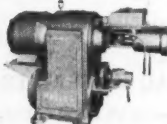
**MOTODRIVE** combines motor, speed varying mechanism and reduction gears in single, compact unit. Speed variations 2:1 to 6:1. Sizes to 40 hp. Also available in fractional sizes with 10:1 ratio.



**VARI-SPEED MOTOR PULLEY** converts any constant speed motor to an accurate, variable speed drive with 4:1 ratio. Rugged, dependable—Sizes to 15 hp. VARI-SPEED JR. available for light machinery.



**VARIABLE SPEED TRANSMISSION** for providing infinite, accurate speed flexibility over a wide range—2:1 to 16:1. Especially adaptable for heavy duty application. Fractional to 87 hp.



**AUTO-PNEUMATIC CONTROL** with linear output speeds is but one of a complete line of automatic controls designed and engineered to operate your machines more efficiently, more profitably, automatically.

**REEVES PULLEY COMPANY • COLUMBUS, INDIANA**

When inquiring check CP 6538 opposite last page

# briefs

from contemporary publications

## Profitability

Simplified profitability calculations are discussed under the headings of projected profit and loss, graphic presentation, payout time, expanding businesses, cash generated, and establishment of price. ("Consulting Engineer," December, 1954, page 44.)

## Survey of dielectrics

Water-repellent silicone alloys appeared in the dielectric picture in 1954 and the use of silicone rubber increased. Research on deterioration and on effects of radiation continues. Nine pages, 3 tables, 12 figures. ("Electrical Manufacturing," December, 1954, page 70.)

## Wet strength of paper

Tensile strength and stretch of wet webs of paper are registered by an automatic electronic recorder. Factors that affect the test are discussed. Five pages, 2 figures. ("Tappi," Dec. 54, page 694.)

## Safety equipment

Suggestions for installing and maintaining explosion-proof equipment are given. Proper sealing is stressed. Two pages, 3 figures. ("Power Engineering," Dec. '54, page 82.)

## Thermal conductivity

When air is removed from fibrous insulating materials and replaced wholly or in part by carbon dioxide or dichlorodifluoromethane, substantial reductions in thermal conductivity result. Six pages, 4 tables, 12 figures, 3 references. ("Heating, Piping, and Air Conditioning," December, 1954, page 121.)

## Rust inhibition

Amine salts of weak organic acids dissociate or hydrolyze and thus permit vapor phase inhibition of rust. Physical properties of such inhibitors and the effects of experimental variables are presented. Seven pages, 5 tables, 55 references. ("Industrial and Engineering Chemistry," December, 1954, page 2592.)

## Compression set test

The relaxed compression set test provides a reliable means for comparing physical properties of rubber at equal states of cure, is a definitive property of vulcanizates, and indicates a specific state of cure. Twelve pages, 16 tables, 8 figures, 5 references. ("Rubber Age," Dec. '54, page 401.)

## Stainless steel

Applications of stainless steel to materials handling, piping, fume removal, architecture, food preparation, and processing equipment are discussed. Specifications of many standard and tentative standard stainless steels are tabulated. ("Mill and Factory," December, 1954, page 100.)

## Bleaching of wood pulp

Eight articles deal with product upgrading, by means of bleaching, in the paper industry. Coverage includes market outlook for bleached pulp; high-density, multistage bleaching of southern pulps by means of peroxide; chlorine dioxide bleaching; multistage bleaching of kraft; and general bleaching of groundwood, neutral sulfate chemical pulp, and kraft. Fifteen pages, 11 tables, 6 figures, 3 references. ("Paper Industry," January, 1955, page 992.)



**abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service for you . . .**

**Radium standards**

Methods of comparing radium standards by means of ionization, calorimetry, the Geiger-Muller counter, and the scintillation counter agree. One British, one Canadian, and two United States radium standards were tested. ("Journal of Research, National Bureau of Standards," Nov. '54, page 267.)

**Heat transmission**

This study of heat transmission, confined to boiling conditions, reveals the necessity for expanded research, tells why fundamental data are so expensive to obtain, and reports progress made in the investigation of boiling. ("Mechanical Engineering," December, 1954, page 981.)

**Flow of heat**

Tables deal with transient radial heat conduction in hollow circular cylinders. Application to sudden temperature changes in the surroundings of a solid propellant rocket is given. ("Jet Propulsion," January, 1955, page 31.)

**Avoiding boiler corrosion**

To avoid corrosion of boiler tubes, four out-of-service factors and seven in-service factors are suggested. Fire-side corrosion is discussed. ("Heating, Piping and Air Conditioning," January, 1955, page 166.)

**Paper markets**

This six-paper symposium on paper markets covers consumer acceptance, attributes of selling, effects of mergers, talents, risks, challenges, and factors that govern demand, supply and price. ("Paper Industry," December, 1954, page 896.)

**Bleaching vegetable oils**

Continuous countercurrent vacuum bleaching of vegetable oils results in a better product than that obtained by batch open kettle and batch vacuum systems. Lower costs than those of the batch methods are reported. ("Journal of the American Oil Chemists' Society," January, 1955, page 1.)

**Paraffin purification**

Normal paraffins are separated from hydrocarbon mixtures through use of sulfuric acid in which either sulfur trioxide or phosphorus pentoxide is present in excess. High temperature and short contact time accompany high recovery. ("Industrial and Engineering Chemistry," January, 1955, page 149.)

**Heavy water**

From England comes a presentation of the difficulties of producing heavy water. Abundance, uses, and separation of isotopes are covered; biological enrichment is considered. ("Industrial Chemist," December, 1954, page 585.)

**Lube oil analysis**

In connection with analysis of lubricating oils, the chief tests and their significances are discussed. ASTM designations are included and factors that affect results are listed. ("Lubrication," January, 1955, page 1.)

**Heat transfer**

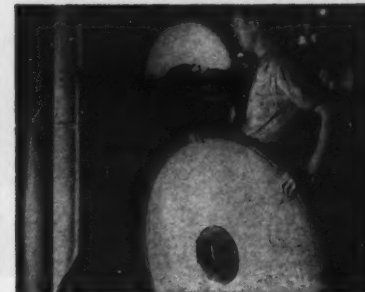
This study of heat transfer deals with helical coils in mixing vessels. Variables covered are tube diameter, position of baffles, power, ratio of impeller size to tank size, and impeller speed. ("Chemical Engineering Progress," December, 1954, page 615.)



STRAINERS



SCREENS



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**FAST, ACCURATE PRODUCTION**  
**OF WIRE CLOTH PARTS**

**FOR FABRICATED PARTS** call your Cambridge Engineers in the field, or call our home office. We'll help you select weaves, mesh sizes and metals to meet your needs and draw up prints for your OK . . . or, work from your prints. On small or large orders, you're assured of strict adherence to specifications by close manufacturing supervision.

**A COMPLETE LINE** of industrial wire cloth is available from Cambridge . . . specifications from the finest to the coarsest mesh in any metal or alloy. Uniform mesh size and accurate mesh count are assured by individual loom operation and careful inspection.

**IF YOU BUY WIRE CLOTH IN BULK**

You can get **IMMEDIATE DELIVERY** on large or small orders for the most frequently used types of cloth. If your needs are not in stock, we'll schedule our looms to get your material to you without delay.

**LET US QUOTE** on your next order for fabricated parts or wire cloth in bulk. Call your Cambridge Field Engineer—he's listed under "Wire Cloth" in your classified telephone book.

**OR, WRITE DIRECT** for **FREE 80-page CATALOG** and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.



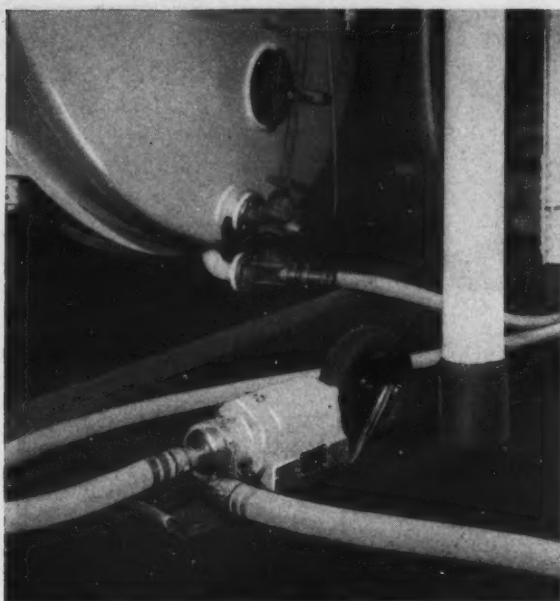
**The Cambridge Wire Cloth Co.**



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## How you can trim power bills with Cherry-Burrell "Flexflo" Pumps

You need less "motor" with "Flexflos" because their exclusive body design always delivers full-flow discharge with low friction losses. Less "motor" means lower initial cost, of course, as well as lower operating power costs.

Exclusive take-apart design permits disassembly in half a minute, including shaft seal. Easy assembly in one minute. All without tools. Stainless steel product contact surfaces. No packing.

### Other Outstanding "Flexflo" Features

**Sanitary:** All contact surfaces of corrosion-resistant stainless steel.

**Positive Sealing** with less pressure, less wear, longer gasket life. No stuffing box.

**Adjustable Outlet:** Can be set in any position to fit every pipeline setup.

**Full range of Sizes:** From 5 to 240 g.p.m.;  $\frac{1}{4}$  to 10 h.p. motors.

### Stainless Tubing and Fittings, Too

We not only have as complete a line of stainless steel tubing and fittings as you can find anywhere . . . but also have them in stock for immediate shipment from a stock point near you—wherever you are.

Ask your Cherry-Burrell Representative about Flexflo stainless steel centrifugal pumps, tubing and fittings. Or write for literature.

### CHERRY-BURRELL CORPORATION

427 W. Randolph Street, Chicago 6, Ill.

Equipment and Supplies for Industrial and Food Processing  
SALES AND SERVICE IN 57 CITIES—U. S. AND CANADA

When inquiring check CP 6540 opposite last page

# new literature

### Advantages of using small truck

Illustrated 28-page booklet shows how small and medium sized plants can use fork trucks for material handling efficiency. This book is written as a training aid and as a text for teachers and students. It describes how a small power fork truck can be used in upper story installations and for loading and unloading motor trucks where floor or spring capacities make it impossible to use heavy fork trucks. Text is simple and many graphic pictures and diagrams are used.

Text also answers questions like: How wide should the aisles be? Should right angle or diagonal stacking be used? What size pallets should be used? How many trucks and how many pallets are needed? What type of power should the trucks employ?

"Why The Small Fork Truck?" is available by writing to Material Handling Div., Market Forge Co., Dept. CP, Everett 49, Mass. When inquiring specify CP 6541 opposite last page.

### PVA polymers, copolymers in water emulsion paint

Briefly, principal advantages of PVA polymer and copolymer emulsions as binding vehicle in water emulsion paints are excellent adhesion to a wide variety of surfaces, ease of manufacture and application, fast drying, non-objectionable odor, good color range, a "breathing" film, all at reasonable manufacturing and raw material cost.

Technical bulletin of over 30 pages describes internally-plasticized PVA copolymer emulsion Resyn 12K51 and gives suggested formulations for primer-sealer, exterior paint, and exterior tint base. Procedures for preparation of these paints, and details on color pigmentation are described in detail. Polyvinyl acetate emulsion Resyn 10K25 is also described.

"National Resyns in Paints, 2nd Ed" is available on letterhead request direct to National Starch Products Inc., Dept. CP, 268 Madison Ave., New York 16, N. Y.

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services

### Outlines methods of bending and joining stainless pipe

Data of interest and value associated with problems involving stainless piping are included in six-page bulletin. Methods of bending and joining stainless pipe are outlined. Problems of light wall versus heavy wall pipe are discussed. Also included are a table of dimensions and weights of various stainless pipe size schedules and condensed technical data on mechanical and physical properties of the more popular stainless steels used for piping.

Bul TB 356 is available from Tubular Products Div., The Babcock & Wilcox Co., Dept. CP, Beaver Falls, Pa. When inquiring specify CP 6542 on handy form opposite last page.

### Catalogs wrought iron products for corrosion resistance

Corrosion-resistant wrought materials in the form of sheet and plate, extruded shapes, pipe and tubing, fittings, fasteners, forgings, and chain are described in 18-page bulletin. Complete specifications are included for all alloys described. Fabrication methods are also covered.

Bul WP-2 is available from Ampco Metal, Inc., Dept. CP, 1745 South 38th St., Milwaukee 46, Wisconsin. When inquiring specify CP 6543 on convenient Reader Service slip located opposite last page.

### Properties, uses of activated carbon in chemical processes

Properties and uses of activated carbon in purification, air recovery, solvent recovery, chemical catalysis, and separation processes are discussed in four-page easy-to-read bulletin.

Form 27 is issued by Barnebey-Cheney Co., Dept. CP, Cassady at 8th Ave., Columbus 19, Ohio. When inquiring specify CP 6544 on handy form opposite last page.



**Counter is capable of speeds  
to 3000 per minute**

Details on a mechanical counter capable of speeds up to 3000 per minute are given in leaflet. Identified by illustration and specifications, unit described contains counts up to one million from an actuating lever force of six ounces, and displays counts by means of four radial pointers on four concentric scales.

Form 550-1054 is available from Raycon Corporation, Dept. CP, 755 Willow Street, Redwood City, Calif. Specify CP 6545 opposite last page.

**Helpful engineering data  
on centrifugal pumps**

Helpful engineering data on industrial centrifugal pumps is offered in 12-page bulletin. Included are specifications on all models, performance diagrams, dimensional drawings, instructions on stuffing boxes, and mounting diagrams. Pumps described range from  $\frac{1}{8}$  to  $\frac{3}{4}$  hp, from 6 to 65 psi, and handle up to 70 gpm.

Bul 110 is available from Eastern Industries, Inc., Dept. CP, 100 Skiff St., Hamden 14, Conn. When inquiring specify CP 6546 opposite last page.

**Uses for diethylene glycol  
and triethylene glycol**

Applications of diethylene glycol and triethylene glycol in plasticizing composition cork and in dehydration of natural gas are discussed in four-page technical bulletin.

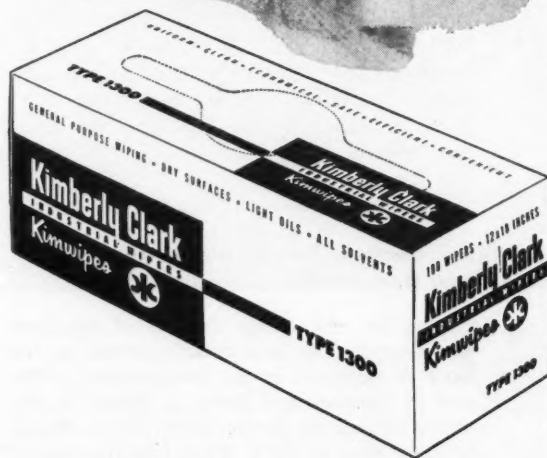
Bul F-8085 is issued by Carbide and Carbon Chemicals Co., a Div. of UCC, Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring specify CP 6547 on form opposite last page.

**Aids correct selection  
of liquid chillers**

Selection procedures enabling user to obtain a unit tailored to exact requirements are presented in four-page bulletin describing packaged liquid chillers. Units discussed are in the capacity range from 15 through 220 tons. Included in the twelve models listed are units for one-compressor, single-circuit installations and others for two-compressor, dual refrigerant circuits.

Bul 220 is available from Acme Industries, Inc., Dept. CP, 411 Mechanic St., Jackson, Michigan. Specify CP 6548 on handy form opposite last pg.

**OLD-FASHIONED INDUSTRIAL WIPERS STEALING YOUR PROFITS ?**



**Modernize your shop — save money — with new**

**Type 1300 KIMWIPES !**

You'll be money ahead when you switch to Type 1300 Kimwipes. They're the modern new disposable wipers that actually replace old-fashioned cloth and waste wiping material and cost four to ten times less!

New Kimwipes 1300 are soft. Strong. Absorbent. A full 12" x 18" in size, they hold up to 8 times their own weight in liquids. They're non-abrasive, too. There's no holdover of metal chips or other infectious material that may cause dermatitis and loss of man hours. Type 1300 Kimwipes are absolutely clean to start with, and are disposed of after use. Ask your salesman for samples. And remember, there are two other kinds of Kimwipes you can choose from: Type 900-S (optical wipers) and Type 900-L (regular wipers). Save money. Order today!



Kimberly-Clark Corporation • Neenah, Wisconsin

When inquiring check CP 6549 opposite last page

# King MANOMETERS

Every Size — for Every Service

## U-Type Manometers

- Single Cleanout
- Single Gland-Packed
- Double Cleanout
- Double Gland-Packed
- High Pressure

Low in price  
Trouble-free  
Easy to install  
and read

## Well-Type Manometers

- Low Well
- Raised Well
- Barometric Reading

Stay clean  
longer  
Easy to service

## Multi-Tube Manometers

- Multi-Well
- Common-Well
- Special-Purpose

**FREE LITERATURE** gives sizes, construction and prices. Write today! And ask for informative 12-page Manual on Manometers.

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REPRESENTATIVES IN PRINCIPAL CITIES

When inquiring check CP 6550 opposite last page

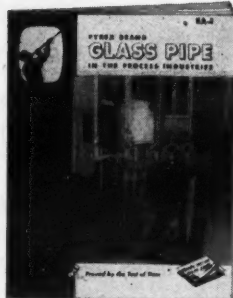
## How many of these pipeline headaches do YOU have?

- ☐ Corrosion
- ☐ Clogging
- ☐ Cleaning
- ☐ Cost
- ☐ Contamination

### This Corning bulletin can help you

"PYREX brand 'Double-Tough' glass pipe in the Process Industries" tells how others in a variety of process industries are whipping tough piping problems with glass pipe. You'll recognize the names of most of the companies who are using PYREX pipe to handle such acids as sulphuric, hydrochloric, nitric, acetic, and such other fluids as chlorinated hydrocarbons, hydrogen peroxide, bromine, brines, low-concentration alkaline solutions, wine, milk, other beverages and foods.

The book covers a wide range of products, problems and processes. Among them you may well find problems similar to yours—solved with PYREX pipe. Bulletin EA-1 is free. Simply send the coupon or check this publication's reader service card for your copy.



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Company \_\_\_\_\_  
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City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check CP 6551 opposite last page

## NEW LITERATURE

### Summarizes information on uses of phthalic anhydride

Description of how phthalic anhydride is used in manufacture of alkyd, oil-modified alkyd, and polyester laminating resins; in plasticizer production; and in organic syntheses of dyes, pharmaceuticals, and other complex molecules is presented in 24-page, two-color booklet.

"Phthalic Anhydride" is issued by Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 12th and Delmar, St. Louis 4, Mo. When inquiring specify CP 6552 on handy form opposite last pg.

### Summarizes thermodynamic values for molybdenum and compounds

Thermodynamic values for molybdenum and its more important compounds are summarized in eight-page data bulletin. It is based on literature of the past 20 years, and should assure virtually complete coverage of all available pertinent data. Besides the 42nd element, MoO<sub>2</sub>, MoO<sub>3</sub>, MoS<sub>2</sub>, MoS<sub>3</sub>, Mo<sub>2</sub>C, MoC, Mo<sub>2</sub>N, the silicides, MoF<sub>6</sub>, MoCl<sub>5</sub>, and other halides are covered.

Bul Cdb-2 is issued by Climax Molybdenum Co., Dept. CP, 500 Fifth Ave., New York 36, N.Y. When inquiring check CP 6552A on handy form opposite last page.

### Points to savings, safety in protective clothes

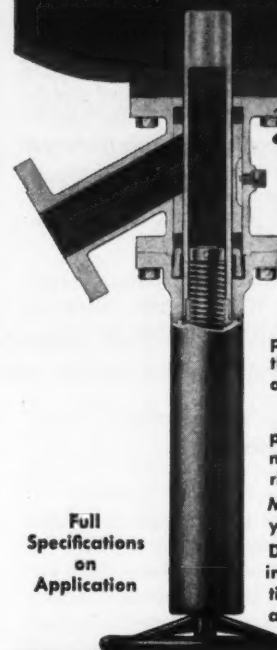
Describing several trousers, coveralls, smocks, and uniforms, three-color, 12-page catalog emphasizes savings which can be attained with synthetic fibers. Extended life of these materials more than pays for high initial first cost. Valuable data are included so that life of garments can be judged for service with dozens of common corrosives.

"1955 Catalog" is issued by Worklon, Inc., Dept. CP, 253 W. 28th St., New York, N.Y. When inquiring specify CP 6553 on handy form opposite last page.

### Offers German, Russian pharmaceutical patent translations

Catalog No. 90, listing abstracts of translated patent applications and research reports on the latest developments in the pharmaceutical industries of Germany and Russia, is offered by Research Information Service, Dept. CP, 53 Nassau St., New York 38, N. Y. When inquiring specify CP 6553A on handy form opposite last page.

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The Only Drain Valve That Cannot Clog Up!

In the closed position the piston or ram extends up into the tank, preventing plugging of the outlet.

In the open position with piston fully retracted, there is no resistance to flow of materials drained from the tank.

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When inquiring check CP 6554 opposite last page

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When inquiring check CP 6555 opposite last page

CHEMICAL PROCESSING



**Details on concrete silos**

Concrete stave storage bins (silos) are detailed in 29-sheet technical brochure. It contains table of cubic foot weights of flowable materials, bin capacities per foot of height, description of wall construction, detail drawings of stave, rods, and lugs, specifications and drawings of concrete roof, and other engineering data.

"Concrete Stave Storage Bins" is available to professional engineers upon letterhead request to The Neff & Fry Co., Dept. CP, 166 Elm St., Camden, Ohio.

**Outlines advantages of nylon as bearing material**

Standard lines of company's nylon-lined bearings and nylon bearing liners are described and illustrated in eight-page catalog.

"Nylined Bearings" is issued by Thomson Industries, Inc., Dept. CP, Manhasset, N.Y. When inquiring specify CP 6556 opposite last page.

**Penetration and tinting strength of polyvinyl acetate paints**

Non-penetration of finished polyvinyl acetate paints must be developed by proper formulation and pigmentation. Twelve-page bulletin reports on penetration and tinting strength studies on blue and gray PVA paints. Penetration was determined by measuring color, gloss, and sheen differences over sealed and unsealed sections of white Morest penetration charts. The factor of color uniformity of tints and deep-tones over surfaces of varying porosity is also considered. Nine pages of tables and graphs accompany the text.

Technical Report No. 29-T is issued by Sierra Talc & Clay Co., Dept. CP, P.O. Box 390, South Pasadena, Calif. When inquiring specify CP 6557 on handy form opposite last page.

**Heat and fuel savings accrue with blow-off system**

How continuous blow-off system maintains uniform dissolved solids concentration in boilers and provides heat and fuel savings is described in 16-page bulletin.

Bul 5700 is available from Cochrane Corp., Dept. CP, 17th St. Below Allegheny Ave., Philadelphia 32, Pa. When inquiring specify CP 6558 on handy form opposite last page.

*Sure,  
that old pump  
still works,  
but how much  
does it cost  
to keep?*

That rugged old pump of yours may not be the bargain that it seems. Let's do some arithmetic. If the efficiency of the old pump is 75% vs. the 85% efficiency of the new pump, you are paying more to keep it than you would to replace it. That's because a new unit of equivalent output uses less power. Thus it soon saves its own cost — then begins to pay dividends.

Let's take a specific example—a small general service pump

Old pump efficiency 70% . . . . . 28.9 BHP

New pump efficiency 79% . . . . . 25.6 BHP

3.3 BHP Saving

On the basis of 1¢ per KWH, the 3.3 BHP saving for a 6000-hour year (approximately 16 hours per day) amounts to \$150. This saving, capitalized in 4 years at 4% adds up to \$630. Yet the price of the new pump that saves \$630 is only \$438.

What would the pump replacement profit be in your particular case? Your De Laval representative can tell you exactly — in dollars and cents — as soon as he has the basic facts on your present installation. Call him in today or write to De Laval for Pump Fax Bulletin which includes a valuable "power-savings" chart.



**DE LAVAL Pumps**

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When inquiring check CP 6560 opposite last page

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When inquiring check CP 6561 opposite last page

## NEW LITERATURE

### Impact mill's capacity ranges from 200-500 lb/hr/hp

Compact unit, doubling as grinding mill and mixer, is reviewed in illustrated four-page folder. Machine is reported to have greatest capacity per hp and per unit of space now available to chemical and food processing industries.

"Impact Mill and Centrifugal Mixer" is issued by Entoleter Division, The Safety Car Heating and Lighting Company, Inc., Dept. CP, P.O. Box 904, New Haven 4, Connecticut. When inquiring specify CP 6562 on handy form opposite last page.

### Describes valves for LPG service

All valves described in eight-page bulletin are disc units, both single-seated and double-seated, which are UL approved for primary shut-off in LP gas lines.

Bul 54-S is available from Okadee Company, Dept. CP, 332 S. Michigan Ave., Chicago 4, Ill. Specify CP 6563 on handy form opposite last pg.

### Covers a yellow pigment for exterior finishes

A stable yellow pigment for outdoor coatings is subject of six-page digest-size folder. Sun Yellow N is a calcined nickel TiO<sub>2</sub>. Physical properties are given in detail.

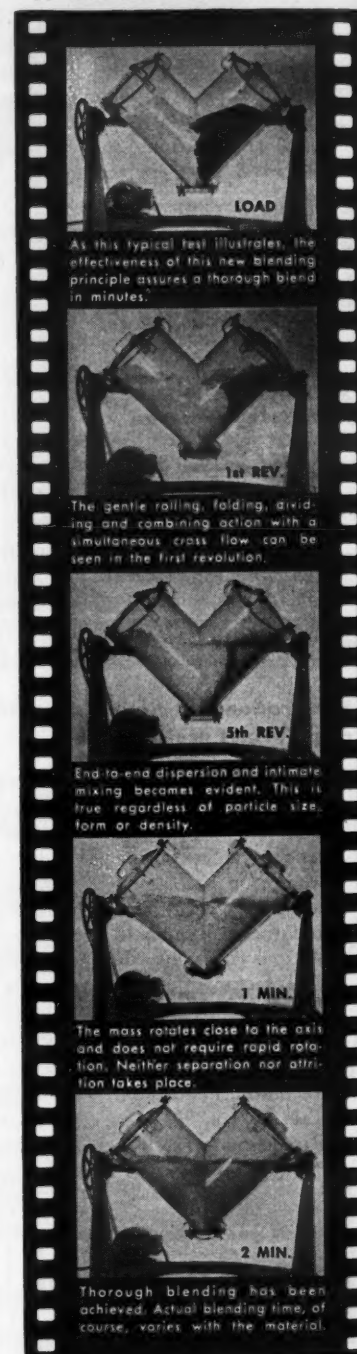
"Sun Yellow N" is issued by The Harshaw Chemical Co., Dept. CP, 1945 E. 97th St., Cleveland 6, Ohio. Specify CP 6564 opposite last page.

### How to control corrosion with stainless steels

Corrosion control with stainless tubing and pipe is described in 28-page information bulletin. Fully illustrated with photographs of parts and applications, booklet contains corrosion-resistant tables, charts, field reports from users, detailed test results, and similar engineering information. In addition, it describes characteristics, performance of several super corrosion-resistant steels. Breakdown of the basic applications for stainless tubing and pipe in anti-corrosion service is included along with information on selection, specific alloys suggested for varying conditions.

"Corrosion Control" is issued by Alloy Tube Div., The Carpenter Steel Co., Dept. CP, 110 Springfield Rd., Union, N.J. When inquiring check CP 6565 on handy form opposite last page.

## Here's why the p-k twin shell blender is faster and better:



As this typical test illustrates, the effectiveness of this new blending principle assures a thorough blend in minutes.

The gentle rolling, folding, dividing and combining action with a simultaneous cross flow can be seen in the first revolution.

End-to-end dispersion and intimate mixing becomes evident. This is true regardless of particle size, form or density.

The mass rotates close to the axis and does not require rapid rotation. Neither separation nor attrition takes place.

Thorough blending has been achieved. Actual blending time, of course, varies with the material.

New Catalog No. 13 gives complete data on sizes, construction details and performance.

**the  
Patterson-Kelley Co., Inc.**

740 Lackawanna Ave.  
East Stroudsburg, Pa.

When inquiring check CP 6566 opposite last page.

CHEMICAL PROCESSING



**Lists isotope-labeled organic compounds**

Four-page list catalogs  $C^{14}$ - and  $N^{15}$ -tagged organic compounds available. These include alcohols, acids, amino acids, and purines and pyrimidines.

Price list "B" is issued by Bio-Rad Laboratories, Dept. CP, 800 Delaware St., Berkeley, Calif. When inquiring specify CP 6567 opposite last page.

**Covers strongly basic anion exchange resin**

Strongly basic anion exchange resins have established themselves in the water-treating field as a convenient means of producing electrolytically pure water, free of all trace quantities of silica and  $CO_2$ . Booklet of 12 pages covers anion resin Duolite A-41, giving properties and performance data.

Data Leaflet No. 31 is issued by Chemical Process Co., Dept. CP, P.O. Box 829, Redwood City, Calif. When inquiring specify CP 6568 opp. last page.

**Qualities of centrifugal given by piston pump**

A self-priming rotary piston pump that works by displacement system and operates with the qualities of a centrifugal pump is described and illustrated in six-page bulletin. Method of operation of German-built unit is illustrated.

Bornemann bulletin is available from Neumann & Welchman, Inc., Dept. CP, 22-12 Raphael St., Fair Lawn, N. J. Specify CP 6569 opposite last page.

For more information on product at right, specify CP 6570 . . . see information request blank opposite last page. ➡

## WHY IS THE PRITCHARD TYPE A HYDRYER THE SOLUTION FOR DRYING GASES?

The Pritchard Type A Hydryer®—a low-cost, packaged dehydration unit has many outstanding features that pay off in drier gas at lower cost.

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**PURGING ELIMINATED.** The Hydryer uses the inlet main gas stream for reactivation, therefore contamination is impossible.

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**PLUS . . .** Pre-heated reactivation gas . . . no moving parts . . . simplified operations . . . reduced equipment and line sizes . . . and many other Pritchard Hydryer features.

**WHO USES A HYDRYER?**

Typical users are E. I. du Pont de Nemours & Co., and Liquid Carbonic Corp. These firms have proved to themselves that the Hydryer is the low-cost answer to moisture problems.

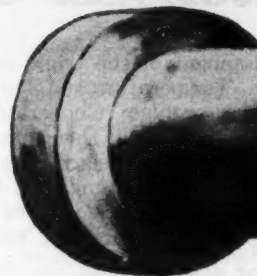
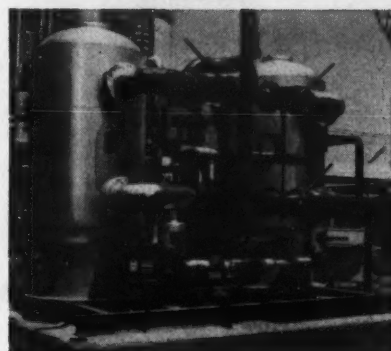
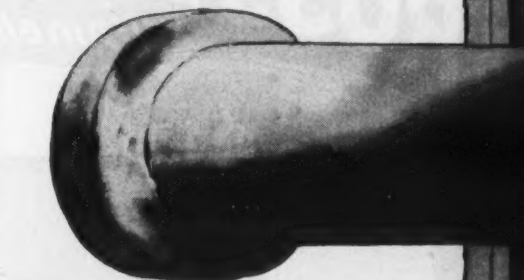
**HOW DO I FIND OUT MORE ABOUT HYDRYERS?**

Write for HYDRYER BULLETIN 16.0.081 on your company letterhead.

**WHEN YOU ARE MAKING AMMONIA** the air and synthesis gas streams must be *exceptionally* dry. Hydryers have proved to be the answer for this vital requirement.

**EXAMPLE:** The Pritchard Hydryer illustrated is on duty at the Cooperative Farm Chemicals Association plant at Lawrence, Kansas. It dries the synthesis gas stream which contains 91% hydrogen and 9% inerts. A continuous flow of 10,000 SCFM enters the Hydryer at 40°F. and 289 psia and is discharged at an exit dew point well below -60°F.

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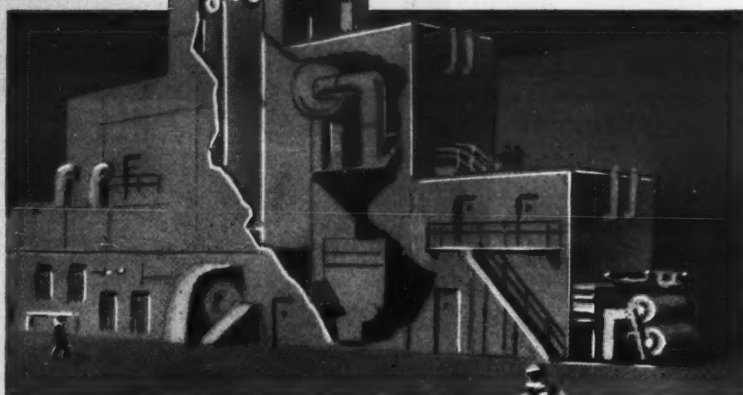
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When inquiring check CP 6571 opposite last page

## NEW LITERATURE

### Finish protects aluminum

Effective method is now available for providing invisible protection for aluminum and its alloys. Alodine No. 1000, such a finish, is described in a four-page booklet. Flow sheet and equipment specifications for immersion process are given along with a description of the finish itself.

"Alodizing with Alodine No. 1000" is issued by American Chemical Paint Company, Dept. CP, PO Box 301, Ambler, Pa. Check CP 6572 on handy form opposite last page.

### Describes equipment for water analyses

Illustrated 12-page bulletin describes titration stands and test sets for hardness, alkalinity, chloride, sulfite, and specific conductance of water. Apparatus for colorimetric and photometric analysis of water is also shown in publication.

"Control Water Analyses" bulletin is issued by W. H. & L. D. Betz, Dept. CP, Gillingham and Worth St., Philadelphia 24, Pa. Specify CP 6573 opp. last pg.

### Lined pipe, fittings described

Specifications and description of Saran-lined steel pipe, fittings, and valves are carried in detail in 32-page bulletin. Flanges, spacers, reducers, gaskets, hose connections, and sight flow are also included. A section is devoted to fabrication and another to chemical resistance of the pipe. Numerous illustrations and tables accompany the text.

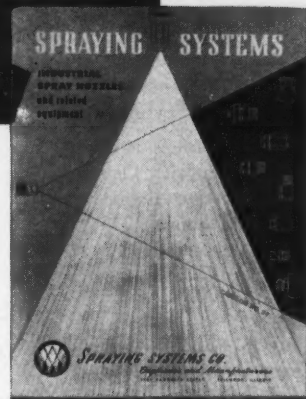
"Saran-lined Pipe and Fittings" is issued by the Saran Lined Pipe Co., Dept. CP, 2415 Burdette Ave., Ferndale 20, Mich. Check CP 6574 on handy form opposite last page.

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### REFERENCE MANUAL

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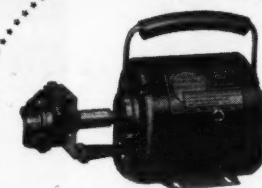
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When inquiring check CP 6575 opposite last page

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- ◀ SIMPLE, COMPACT, ONLY ONE MOVING PART
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FREE—send for catalog sheets, detailed information... no obligation, of course!

JABSCO PUMP COMPANY  
2031 Lincoln Street, Burbank, California

When inquiring check CP 6576 opposite last page

CHEMICAL PROCESSING



### Coatings based on materials in Portland cement

Line of industrial coatings containing pigment developed from materials found in Portland cement is covered in 32-page illustrated catalog. Incorporation of this material into the coatings is said to give them outstanding performance in preventing rust and in durability on steel and galvanized iron. Of particular interest is booklet inside envelope of back cover which gives specifications and recommendations for a variety of applications.

Cat 54 is issued by Tnemec Co., Inc., Dept. CP, 123 W. 23rd Ave., N. Kansas City 16, Mo. Check CP 6577 on handy form opposite last page.

### Needle and globe valves have bellows seal

Needle and globe valves for liquid or vapor, vacuum or pressure service are described in four-page bulletin. Units have bellows seal and are available with Teflon disc or metal-to-metal seating. Service range, sizes available, connections, materials of construction are presented along with line drawings of the valves.

Bulletin on Series 1206, 1206-A, 1206-AC, and 1206-C valves is issued by Associated Valve & Engineering Co., Dept. CP, 1150 West Marquette Road, Chicago 21, Ill. When inquiring specify CP 6578 on handy form opp. last page.

### Emulsifiable insecticide formulations

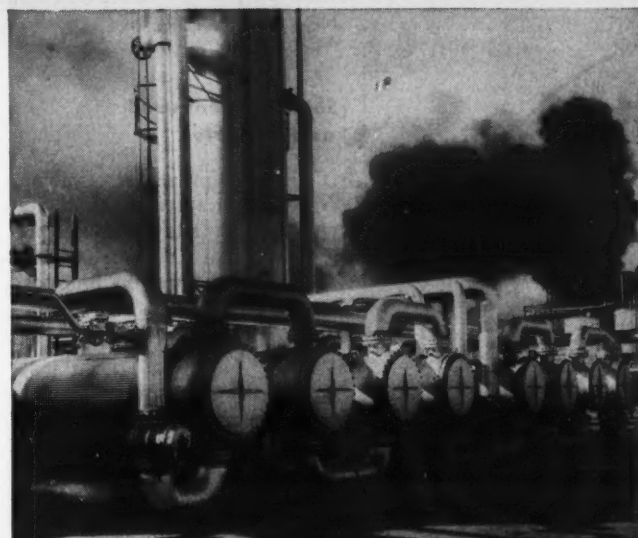
Latest edition of manual gives compilation of formulations of emulsifiable insecticide concentrates. Physical properties and other pertinent data of Emcol emulsifiers are given in detail in the 16-page manual.

Bul No. 42 is issued by The Emulsol Corp., Dept. CP, 59 E. Madison St., Chicago 3, Ill. Check CP 6579 on handy form opposite last page.

### Outlines and correlates studies on ATP

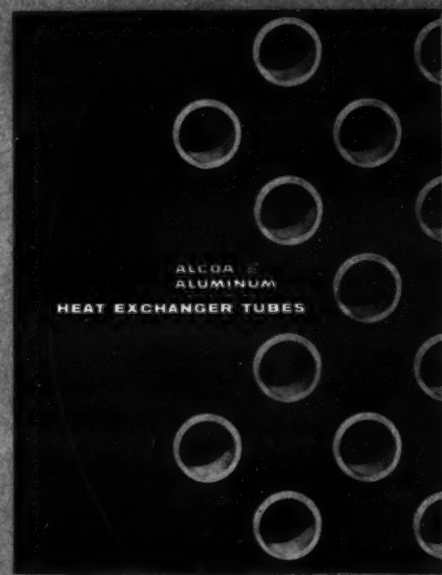
More than 25 years of research on adenosine triphosphate (ATP) are outlined and correlated in technical bulletin.

Bul 113a is issued by Schwarz Laboratories, Inc., Dept. CP, 230 W. Washington St., Mt. Vernon, N. Y. Specify CP 6580 opposite last page.



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## ALCOA ALUMINUM HEAT EXCHANGER TUBES



Just off the presses, this booklet brings you all the facts about the latest developments in aluminum heat exchanger tubes. Profusely illustrated with photos, charts and graphs. Provides specifications and estimating data that are the result of ALCOA's more than 30 years' experience with aluminum tubes for condensers and heat exchangers.

### TABLE OF CONTENTS

- Why Alcoa Aluminum Heat Exchanger Tubes?
- Types of Alcoa Heat Exchanger Tubes
- What is Alclad?
- Effect of Cooling Waters
- Cathodic Protection
- Tube Cleaning
- Water Treatment
- Application of Aluminum Heat Exchanger Tubes
- Typical Commodities Processed
- Aluminum Is Well Suited for Heat Exchanger Fabrication
- Heat Transfer Characteristics
- Physical Constants
- Fluid Flow Characteristics
- Specifications and Data
- Estimating Data
- Allowable Internal Working Pressures
- Allowable External Working Pressures
- Typical Tensile Properties of Aluminum Alloys
- Nominal Composition of Wrought Aluminum Alloys

The general acceptance of aluminum heat exchanger tubes by the process industries has come about for several reasons—the excellent properties of aluminum alloys, ALCOA's cooperative research and development programs aimed at establishing sound applications, and industry's desire for a good product at an economical price.

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When inquiring check CP 6581 opposite last page



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Conseco and its subsidiaries design, build, and install power and processing equipment and accessories, some of which are listed here. Purchasers of Conseco equipment benefit from our maintenance division's quarter century experience in rebuilding, modernizing, and maintaining our own as well as competitors' equipment. This coordination assures easy accessibility for maintenance and low operating cost. Send for bulletins covering equipment in which you are interested.

**HEAT EXCHANGERS  
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STEAM GENERATORS  
PRESSURE VESSELS  
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FILTERS and STRAINERS  
PUMPS, INSTRUMENTS,  
SPECIALTIES**

When inquiring check CP 6582 opposite last page

### NEW LITERATURE

#### Shows solvent used as dye carrier

Physical properties, solubilities, applications, physiological properties and handling precautions of "Ketosol" Solvent 75 are presented in four-page bulletin.

Suggested uses include: assistant for dyeing Dacron polyester fibers, removal of sludges and gums, and as an extraction solvent in refining lubricating oils. A table of constant boiling mixtures of solvent with water is included.

Bul F-7370 is issued by Carbide and Carbon Chemicals Co., Div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N. Y. When inquiring check CP 6583 on handy form opposite last page.

#### Alkyl chlorides, bromides listed

Data sheet presents technical information on the alkyl chlorides of various chain lengths ( $C_{14}$  to  $C_{18}$ ). The alkyl bromides of  $C_{10}$  to  $C_{18}$  chain lengths are also described.

"Alkyl Halides" is issued by Aceto Chemical Co., Inc., Dept. CP, 40-40 Lawrence Street, Flushing 54, N. Y. When inquiring check CP 6584 on handy form opposite last page.

#### Over three hundred rare chemicals

Over 300 rare or special chemicals are listed in four-page two-color folder entitled "Drumful or Jarful". Booklet is issued by City Chemical Corporation, Dept. CP, 132 W. 22nd St., New York 11, N. Y. When inquiring check CP 6585 on handy form opposite last page.

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Gaskets, shims and washers can be supplied in metallic, non-metallic and plastics . . . teflon, nylon, etc. . . and in quantities to meet your production requirements.

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**CHICAGO-WILCOX MFG. CO.**  
7701 South Avalon,  
Chicago 19, Illinois

When inquiring check CP 6587 opposite last page

CHEMICAL PROCESSING



### Guessing at boiler water levels ended by remote indicators

Remote-reading, liquid-level indicators which end guessing at boiler water level are described in detail in 20-page bulletin. Applications, advantages, installation and operating data, and design specifications of units are all described and illustrated. Photos show typical installations of indicators on boiler room panels.

Bul WG 1824 (54) is available from Yarnall-Waring Company, Dept. CP, Mermaid Lane, Philadelphia 18, Pa. Check CP 6588 opp. last pg.

### Lighting aids air conditioning and noise reduction

Fluorescent lighting louver-diffuser which aids air conditioning and noise reduction where installed is described and illustrated in eight-page bulletin. Details on the design and features of these plastic grid louvers are included. Drawings and installation photos accompany text.

"The Gratelite Story" is available from The Edwin F. Guth Company, Dept. CP, 2615 Washington Blvd., St. Louis 3, Mo. When inquiring specify CP 6589 opposite last page.

### Steel shipping containers and spouts described

Lug-cover pails, tight-head drums, lug-cover pouring pails, dome-top and flexible-spout utility cans, and grease gun loader pails are among steel shipping and storage containers described in four-page bulletin. Spouts of metal and plastic for various uses are pictured.

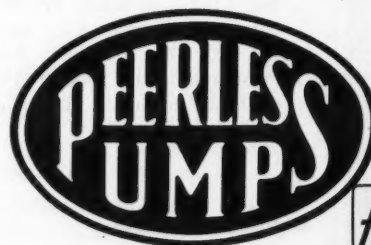
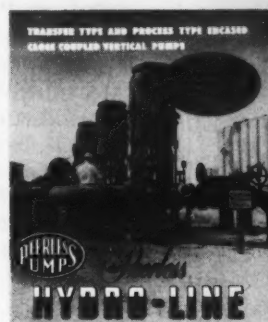
Form No. A-127 is issued by Geuder, Paeschke, & Frey Co., Dept. CP, 324 N. 15th St., Milwaukee 1, Wis. Check CP 6590 opp. last page.

### Describes fork truck handling without pallets

Bulletin describes how Rayonier has perfected a system for handling, storing, and shipping baled material in unskidded unit loads. Booklet shows how chemical cellulose is handled but practices used here can apply to any other material.

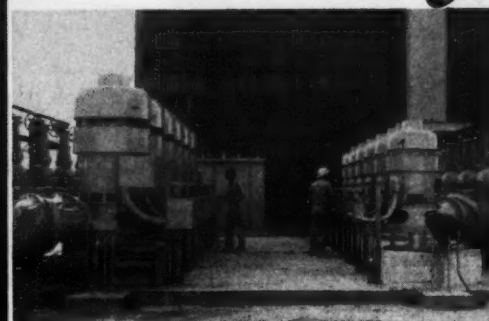
Vol 25 No. 1, "Storage Battery Power" is available from Edison Storage Battery Div., Thomas A. Edison, Inc., Dept. CP, West Orange, N. J. Check CP 6591 on handy form opposite last page.

# new



**PEERLESS PUMP DIVISION**  
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 Factories: Los Angeles 31, Calif. and Indianapolis 8, Ind.  
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## THE TREND IS TO VERTICAL PUMPS FOR TRANSFERRING MANY TYPES OF PROCESS LIQUIDS



# Vertical Versatility

**HERE ARE TWO PEERLESS PUMPS THAT MEET THE NEED WITH ECONOMY, EFFICIENCY AND DEPENDABILITY**—The two new Peerless pump bulletins shown at the left above describe the two types of modern Peerless process liquid pumps shown installed at the right.

Write for your copies. They describe and illustrate the pluses of Peerless vertical process pump design, construction and operation.

Bulletin No. B-1700 describes Peerless Hydro-Line can type pumps; Bulletin No. B-505 describes Peerless industrial service pumps. Both types are applied to the successful transfer of processing liquids. Use the coupon below.

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**Food Machinery and Chemical Corporation**  
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☐ PEERLESS VERTICAL INDUSTRIAL  
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When inquiring check CP 6592 opposite last page



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**Antibiotics to  
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FOR "HARD-TO-HANDLE" FLUIDS

## HILLS-McCANNNA Diaphragm Valves

The range of "hard-to-handle" liquids, gases and slurries that can be handled successfully with Hills-McCanna diaphragm valves is virtually without limit. From antibiotics which are being handled in the plant pictured above to the toughest acids, alkalis and salts, there is a combination of Hills-McCanna body and diaphragm materials that will best suit your needs.

A choice of 15 diaphragm materials, 40 body materials and 36 operators makes it possible to "tailor" Hills-McCanna valve assemblies to almost any requirement.

If you value any "hard-to-handle" fluid, it will pay you to take advantage of Hills-McCanna's extensive experience. For specific recommendations, send an outline of your requirements. Or, if you prefer, write for your copy of the Hills-McCanna valve catalog.

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# HILLS-McCANNNA

*saunders patent diaphragm valves*

Also manufacturers of  
Chemical Proportioning Pumps • Force-Feed Lubricators  
Magnesium Alloy Sand Castings

When inquiring check CP 6593 opposite last page

## NEW LITERATURE

### Gives properties of catalyst

Synthetic cracking catalyst in microspheroidal form is described in four-page bulletin. Chemical, physical, and catalytic properties are listed.

"M-S Catalyst" is issued by Petroleum Catalyst Dept., Davison Chemical Co., Div. of W. R. Grace & Co., Dept. CP, 101 N. Charles St., Baltimore 3, Md. When inquiring specify CP 6594 opposite last page.

### Decontamination safety suits described

Two new styles of decontamination safety suits are described in bulletin. One of these is made of a flexible butyl material. This suit offers protection against nitrobenzene, nitrotoluene compounds, and aniline. It is designed to allow the wearer maximum flexibility in his work. Dehumidified air, cooled or heated, is supplied to both suit and hood through a combination hose and safety cable entering the suit through its back.

Similar in design to the chemical type suit, the acid type decontamination suit is made of neoprene fabric. It offers protection against slight contamination of acids.

Bul 1301-2 is issued by Mine Safety Appliances Co., Dept. CP, 201 N. Braddock Ave., Pittsburgh 8, Pa. Check CP 6595 on handy form opp. last page.

### Catalogs organics

Catalog No. 6 lists organic research chemicals in alphabetical order and by group. About 900 compounds are included in the 52-page digest-size booklet, which is available from Aldrich Chemical Co., Inc., Dept. CP, 3747 N. Booth St., Milwaukee 12, Wis. When inquiring specify CP 6596 opposite last page.

## Reduce... MAINTENANCE COSTS WITH FRANGIBLE DISCS

- NO FRAGMENTATION . . . Disc ruptures in several similar lobes. Gives unrestricted opening.
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When inquiring check CP 6597 opposite last page



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**RESISTANT PIPING MATERIALS**  
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Exclusive National Sales Agents  
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**ACE PARIAN**

(Polyethylene Plastic)  
**CHEMICAL PIPING**

Perfect combination—Ray Miller's knowledge of corrosion-resistant products and American Hard Rubber Company's century of experience! Ace Parian is a tough, odorless, non-toxic Polyethylene compound—light weight and excellent impact strength even at sub-zero temperatures. Rigid piping 1/2" to 2"; large line of fittings and valves specifically designed to meet the requirements of the paper, pharmaceutical, food, food, beverage, plating and chemical processing industries. Write for bulletin.

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When inquiring check CP 6598 opposite last page

CHEMICAL PROCESSING



*You name the  
metal or plastic*

**WE'LL MAKE THE  
Swagelok®  
TUBE FITTINGS**



**EASY TO USE . . . . .**

**NO SPECIAL TOOLS NEEDED**

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From stock or on special order, you can get Swagelok Tube Fittings in any metal you require ranging from titanium to brass — in fact, any machinable metal or plastic. When you use Swagelok Tube Fittings every joint is leakproof. No bothersome small leaks to cause shut-downs. Tubing is rigidly supported, thereby avoiding vibration. No torque is transmitted to the tubing. Swagelok Tube Fittings can be used on heavy or thin wall tubing of every tube material, including plastic. Plus the fact that Swagelok joints are easier and faster to make. Get the facts now.

**FREE:** For complete information write for the Swagelok catalog. Address Dept. C-12.

**CRAWFORD FITTING CO.**

884 E. 140th Street

Cleveland 10, Ohio

When inquiring check CP 6599  
opposite last page

**NEW LITERATURE**

**Shows applications of lining  
for processing equipment**

Smooth, glossy, corrosion-resistant, thermosetting phenolic lining for processing equipment is pictured and described in eight-page bulletin. Company's service for applying this lining is also detailed. Lining described provides an easy-to-clean surface which prevents build-up of adhesive materials, and facilitates removal of sediment formations. It protects materials from taste and odor contamination.

Bulletin on Lastiglas is available from The Bishopric Products Co., Dept. CP, 4413 Este Ave., Cincinnati 32, Ohio. When inquiring about manufacturer's product, specify CP 6600 on convenient Reader Service slip which is located opposite last page.

**Pictures, describes complete line  
of portable mixers**

Manufacturer's line of portable mixers are illustrated and discussed in 16-page catalog. Complete with photographs, drawings, and charts, literature lists design features, capacities, and other specifications. Highlight of catalog is section devoted to mixer data. Various factors, such as viscosity, number of propellers, and horsepower, are discussed.

Bul 74-A is issued by International Engineering, Inc., Dept. CP, 15 Park Row, New York, New York. When inquiring about manufacturer's product, reader may simply specify CP 6601 on convenient Reader Service slip which is located opposite last page.

**Corrosive liquid, gas filtration  
handled by Teflon cloth**

Data on filter cloth of Teflon for corrosive liquid and gas filtration are compiled in two-page bulletin. Chemical- and temperature-resistance information as well as physical properties and flow capacities of the two porosity grades of cloth offered are provided.

Bul T-112 is available from Porous Plastic Filter Company, Dept. CP, 30 Sea Cliff Avenue, Glen Cove, New York. When inquiring about manufacturer's product, reader may simply specify CP 6602 on convenient Reader Service slip which is located opposite last page.

For more information on product advertised at right, specify CP 6603 . . . see information request blank opposite last page.



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"50" ANNUNCIATOR  
SYSTEMS**



PANALARM "50" PLUG-IN UNIT . . . hermetically sealed and most versatile ever developed . . . simply plugs into chassis to expand system . . . no wiring . . . no other connections. Corrosion-proof and suitable for Class I, Div. 2 locations.

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flexibility with  
NEW "instrument-  
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Built-in flexibility of PANALARM "50" allows simple change-over to any operating sequence as required by present or future conditions. And, at the same time PANALARM "50" introduces a new instrument-type annunciator construction . . . adding to the long-term dependability of the entire system.



CABINET is substantial gauge steel with sturdy chassis and sub-door arrangement. It is pre-wired ready for installation, yet completely flexible without re-wiring.



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24 HOURS A DAY . . . with FEinc STRING FILTERS

The clean, unbroken sheet seen here is composed of refined kaolin which is coming off the discharge end of a FEinc String Filter at J. M. Huber Corporation, Huber, Ga. The uniformly dewatered cake, although of a sticky character, is cleanly lifted from the revolving filter drum by closely spaced strings which carry the clay blanket to the discharge roll, where it drops into the trough.

The FEinc String Filter is successfully delivering cleaner, dryer cakes with materials ranging all the way from thin, soupy slimes, colloidal gels, greasy waxes, etc., to flocculent, fibrous or crystalline cakes . . . with less "down time" and lower maintenance costs. In a surprising number of cases this FEinc is the most economical of all filters for the "easy" jobs as well as the tough ones.

The FEinc String Discharge Filter is only one of many continuous filters now made by Filtration Engineers. Our engineering service is the finest available, backed by 35 years of experience, and backed by the ability to deliver filters that are tailor-made to fit the job . . . at no more than standard costs. Write or telephone us today for more details.

Test the actual performance of FEinc . . . at low cost . . . rent this small pilot-plant filter with interchangeable string or scraper discharge. Write for facts.



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CUSTOM DESIGNERS AND MANUFACTURERS OF ALL  
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When inquiring check CP 6604 opposite last page

### NEW LITERATURE

#### Properties of pigments: dry or in resin medium

Two data sheets list the physical properties of the most widely accepted coloring pigments used in rubber and vinyl compounding. Both dry pigments and those dispersed in a plasticized resin medium are covered. Properties discussed include specific gravity, light-fastness, alkali-acid resistance.

Buls 02-14-0-7-54 (resin medium) and 02-175-1-4-54 (dry) are issued by Harwick Standard Chemical Co., Dept. CP, 60 S. Seiberling St., Akron 5, Ohio. When inquiring specify CP 6605 on handy form opposite last page.

#### Super refractories — properties and uses

Principle characteristics and fields of application of several super refractories are detailed in 24-page bulletin. Literature is intended to show what these refractories are and what they can do. Tables, graphs, and photographs illustrate text.

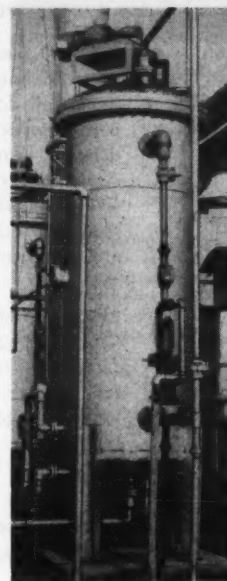
Form 5056 is available from Refractories Division, The Carborundum Company, Dept. CP, Perth Amboy, N.J. When inquiring specify CP 6606 on handy form opposite last page.

#### Describes and illustrates glass fiber insulation

Description and illustration of various types of company's Aerocor glass fiber insulation are included in eight-page booklet. Physical properties are covered and numerous installations of the insulations are pictured and discussed.

Form GL6 C4 is available from Owens-Corning Fiberglass Corporation, Dept. CP, 1833 Nicholas Bldg., Toledo 1, Ohio. When inquiring specify CP 6607 on handy form opposite last page.

## Efficient/Practical SOLVENT EXTRACTION AT LOW COST



The York-Scheibel multi-stage extraction column is ideal for simple counter-current extraction; and for fractional liquid extraction in which the feed material is simultaneously contacted by two selective and immiscible solvents.

Check these features . . .

- POSITIVE MIXING
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- SINGLE, COMPACT COLUMN
- HIGH THROUGHOUT CAPACITY
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**YORK**

YORK PROCESS EQUIPMENT CORP.

4 Central Avenue  
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Complete illustrated catalog available describing laboratory, pilot plant and large scale extraction columns.

When inquiring check CP 6608 opposite last page



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(REPLACE PIPE COILS)

cost less than fabricating  
pipe coils in your own plant

You can buy Platecoils for less money than it costs to fabricate pipe coils in your own plant. You also save critical steel because Platecoils require less than 1/2 the steel used in pipe coils of the same surface area. Installation takes far less time as Platecoils are mounted on simple hangers instead of the complicated racks needed for pipe coils. They take 50% less space.

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technical manual and  
descriptive Bulletin No. P54

**PLATECOIL**  
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Tranter Mfg. Inc.  
LANSING 4, MICHIGAN

When inquiring check CP 6609 opposite last page

CHEMICAL PROCESSING



### Photographs, drawings highlight book on electrical precipitation

General principles and applications of electrical precipitation are described in 28-page bulletin. Individual sections are devoted to acid manufacture, carbon black, oil refineries, pulp and paper, and other industries. Photographs, line drawings, and flow diagrams highlight book.

"How Industry Uses Cottrell Precipitators" is issued by Research-Cottrell, Inc., Dept. CP, 405 Lexington Avenue, New York 17, New York. When inquiring specify CP 6610 on handy form opposite last page.

### Applications and properties of molded fabric bearings

Brochure of 32 pages illustrates and describes applications and properties of molded fabric bearings, wear plates, and other parts. Bearings made for grease or oil lubricated, water lubricated, unlubricated, and acid-resistant services are shown. Also illustrated are a variety of molded asbestos brake blocks, frictions, cones and other shapes.

Form IP410 is available from Gatke Corporation, Dept. CP, 228 N. La Salle St., Chicago 1, Ill. Check CP 6611 on handy form opp. last page.

### Tentative standard specifications for sodium silicofluoride

Six-page digest-size booklet discusses material specifications, sampling and packing, and testing methods of sodium silicofluoride for fluoridation of water supplies.

Tentative standard B702-54T may be obtained by remitting 20c direct to American Water Works Assn., Inc., Dept. CP, 521 Fifth Ave., New York 17, N.Y.

### Hexahydro phthalic anhydride subject of data bulletin

Chemical reactions, uses, and physical properties of hexahydro phthalic anhydride are presented in four-page data bulletin. Suggested uses for the compound are as a plasticizer, insecticide, insect repellent, and rust inhibitor.

Technical Bul I-2 is issued by National Aniline Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y. When inquiring specify CP 6612 on handy form opposite last page.

**Material:** Activator solution—water with 5% ferro-sulphate.

**Problem:** Short service life of turbine pumps; sometimes only two weeks.

**Solution:** First Moyno ran 6 months without a breakdown. Using relief valves, pressure is kept at constant 120 p.s.i. Now using 7 Moynos because of this exceptional service.

**Material:** 40° copperas crystals in 20% sulphuric acid.

**Problem:** Low production of diaphragm pump.

**Solution:** Moyno pump handles an increased percentage of solids, which in turn increases production.

**Material:** Anti-scale boiler treatment. (Alcohols, oils, anti-foam agents, sludge conditioners.)

**Problem:** Frequent pump breakdowns caused by back pressure of spray nozzles; and abrasion.

**Solution:** Moyno pumps cut pumping time from 20 minutes to 3, reduced down-time, increased production 200%!

**Material:** Calcium carbonate slurry.

**Problem:** Continuous failures of centrifugal pumps.

**Solution:** Moyno pump still giving perfect service after 1½ years. Service is practically continuous—with pump in operation 24 hours per day.

**Material:** Caustic solution—for use in mercerizing machines.

**Problem:** Rotary pumps wore quickly; lost capacity, and did not have enough suction.

**Solution:** Moyno pumps cut maintenance and repairs to minimum—had ample suction for drawing caustic through the cloth.

**Material:** Size—containing china clay and latex.

**Problem:** Centrifugals unable to handle viscosity—causing frequent trouble.

**Solution:** Moyno pump has been on duty for a year. Pump trouble completely eliminated; no repairs required.

## Six Chemicals-Handling Problems... Solved by the MOYNO® PUMP!

### Features of the MOYNO that may solve YOUR pumping problem

**Positive Displacement**—Moynos are available to pull up to 29" vacuum while discharging under pressure. Big Moynos deliver up to 250 g.p.m. at pressures to 600 p.s.i.

**Gentle**—No churning; won't break up semi-solids; won't aerate liquids.

**Reversible**—The Moyno pumps with equal efficiency in either direction.

**Versatile**—handles liquids, abrasive slurries, pastes—even potato salad! Rotor and stator are available in stainless steel, other alloys or plastics to meet a wide variety of applications.



**Trouble-Free**—self priming; won't cavitate or vapor-lock. Just one moving part—no valves to stick, no pistons to gum up. Built for tough service. Easy to maintain.

Looking for a pump with a fast-growing reputation for solving tough pumping problems? Then take a look at the simple, versatile Moyno!

Briefly described above are a few of the many successful case histories proving how Moynos handle jobs where other pumps fail. Why is the Moyno a "problem-solving" pump? For one thing, because it differs completely from conventional pumps . . . rotary, centrifugal or piston. Just one rugged moving part—a rotor turning within a stator—does the job.

The list of chemicals handled by Moynos gets longer every day. If you have a pumping problem, such as handling abrasive slurries, mild acids, caustics—watery, viscous or even semi-solid—find out if the Moyno can help you! Use the coupon below for prompt, complete information.

## ROBBINS & MYERS • INC.

SPRINGFIELD 99, OHIO • BRANTFORD, ONTARIO



Robbins & Myers, Inc.  
Pump Division, Springfield 99, Ohio

Gentlemen: Please mail free copy of Bulletin 30-B containing details on construction and operation of Moyno Pumps:

Name \_\_\_\_\_ Title \_\_\_\_\_

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When inquiring check CP 6613 opposite last page

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To improve your product call on Proctor & Schwartz, Inc., who not only manufacture drying equipment, but have the know-how to help you in materials handling problems which arise both in feeding the dryer and delivering your product to subsequent processing equipment.



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- ☐ PLEASE SEND BULLETIN 390.  
☐ HAVE YOUR ENGINEER CONTACT US.

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When inquiring check CP 6614 opposite last page

### NEW LITERATURE

#### Properties, specifications of solvent for cellulose

Physical properties, specifications, shipping data, general solvent properties, constant boiling mixtures, physiological properties, and suggested uses for methyl Cellosolve acetate (ethylene glycol monomethyl ether acetate) are presented in four-page technical data sheet. The acetate is a good solvent for cellulose acetate and other cellulose esters.

Bul F-8623 is issued by Carbide & Carbon Chemicals Co., a Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. Check CP 6615 opposite last page.

#### Construction and applications of cooling towers

Detailed explanation of cooling tower construction and applications is presented in 36-page bulletin. Photos, sketches, cutaway and exploded drawings show components of structural and mechanical equipment. Advantages of "Counter-flo" design and methods of water distribution are described in detail.

Bul CT-ID-0.002 is available from The Fluor Corporation, Ltd., Dept. CP, 2500 S. Atlantic Blvd., Los Angeles 22, Calif. When inquiring specify CP 6616 on handy form opposite last page.

#### Includes corrosion data tables for various metals

Corrosion data tables listing corrosive action of 200 different chemicals in various concentration forms on 16 different metals are included in 48-page catalog which discusses custom fabrication of tanks and vessels for the processing industries.

Cat 554 is available from Nooter Corp., Dept. CP, 1400 S. Second St., St. Louis, Missouri. When inquiring specify CP 6617 opposite last page.

#### Technical data presented on unmodified epoxy

Amber-colored, unmodified epoxy resin Araldite 6060 is described in 16-page technical bulletin. Properties of the resins, along with casting applications and physical and electrical properties of typical castings are given in detail.

Tech Data Bul No. 2 is issued by Plastics Div., Ciba Co., Inc., Dept. CP, 627 Greenwich St., New York 14, N.Y. Specify CP 6618 opp. last pg.

## Catawissa PERFECT SEAL Unions

**HOT FORGED** from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

**A TYPE FOR EVERY USE!**  
FOR ALL PRESSURES!  
FOR ALL TEMPERATURES!



#### Standard & Double Extra Heavy UNIONS

Available with screwed or socket weld ends. 3000-lb. sizes 1/8" to 3"; 6000-lb. sizes 1/8" to 2".

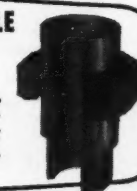


#### ORIFICE UNIONS

With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

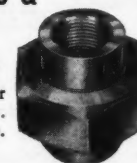
#### MALE & FEMALE UNIONS

With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.



#### FULL STAINLESS & FULL ALLOY STEEL UNIONS

With screwed or socket weld ends. 3000-lb. and 8000-lb. service.



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showing the complete Catawissa  
line of Perfect Seal Products

#### CATAWISSA VALVE AND FITTINGS COMPANY

620 Mill St. • CATAWISSA, PA.

When inquiring check CP 6619  
opposite last page

CHEMICAL PROCESSING

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**Shows different types of conveyors**

Illustrated bulletin of 12 pages describes portable stacking conveyors, floor-to-floor, horizontal belt conveyors, gravity roller conveyors, and gravity wheel conveyors. It includes a wide variety of types and sizes especially adapted to loading and unloading, storage, warehousing, order picking, etc.

Catalog 4000 is available from Samuel Olson Mfg. Co., Inc., Dept. CP, 2418-22 Bloomingdale Ave., Chicago 47, Ill. Check CP 6620 on handy form opposite last page.

**Catalog on extruding machines contains 61 photographs**

Plasticators, pelletizers, extruders, strainers, strainer-extruders, tubing machines, German mixers, and special-purpose machines for use in rubber and plastics industries, are described in 32-page booklet. Complete with drawings and tables, catalog contains 61 photographs, and covers entire line of extruding machinery. Description of manufacturer's facilities is also included.

Bul 195 is issued by Farrel-Birmingham Company, Inc., Dept. CP, Ansonia, Connecticut. When inquiring specify CP 6621 on handy form opposite last page.

**Color pastes for vinyl plastic permits exact duplications**

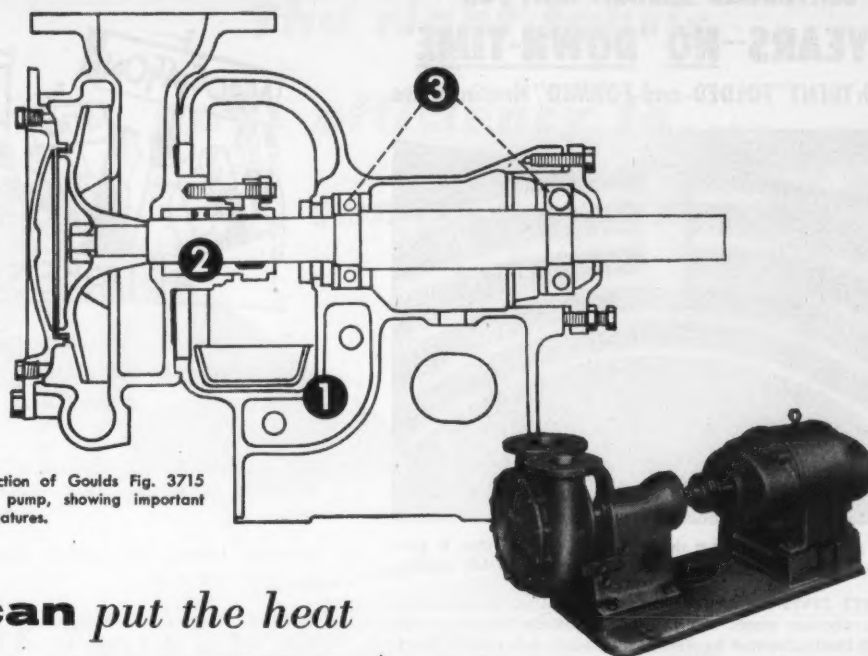
Strength-controlled Calibrated Flushed Colors are subject of three-page data sheet. Pigments permit exact duplication of color for the vinyl compounder.

"Calibrated Flushed Color Pastes" is issued by Claremont Pigment Dispersion Corp., Dept. CP, 110 Wallabout St., Brooklyn 11, N. Y. When inquiring specify CP 6622 opposite last page.

**Catalysts described**

Catalysts for producing synthesis gases and hydrogen, hydrogenation, selective removal of acetylene, desulfurization, and oxygen removal are subject of 16-page hand-size brochure. A number of different catalysts under each type are described.

"Girdler Catalysts" is issued by Gas Processes Div., The Girdler Co., a Div. of National Cylinder Gas Co., Dept. CP, Louisville 1, Ky. When inquiring specify CP 6623 opposite last page.



Cross section of Goulds Fig. 3715 chemical pump, showing important design features.

## You can put the heat on this chemical pump

Handling hot, corrosive, or abrasive liquids is what the Goulds Fig. 3715 pump is built for.

You can run this pump at 350° F. by cooling the support head (1) and quenching the gland, through fittings that are built in.

And you can get the pump in a variety of materials to meet your particular liquid-handling needs—type 316 stainless steel, Gould-A-Loy 20 (equivalent to ACI CN 7M CU), all bronze, bronze-fitted, all iron, or iron or bronze with stainless trim. These materials regularly stocked—other material can be furnished on order.

**Wide range of sizes**

There's a size, too, to meet most requirements—nine sizes in all, providing capacities up to 720 GPM, and heads to 200 ft.

Whatever size and construction material you need, you can be sure that your Goulds Fig. 3715 pump will operate with high efficiency and low maintenance cost.

**Mechanical seals available**

The stuffing box (2) is on the suction

side of the impeller, subject to suction pressure only. Or we can equip your pump with either a single or double mechanical seal. Completely sealed bearings (3) keep out dirt and moisture, and are grease lubricated.

You can inspect and clean the interior of the pump, or remove and replace the impeller, without disturbing piping connections. You can adjust axial clearance between the impeller vanes and the casing by external means.

**Interchangeability of parts**

And you can keep your parts inventory low, for many of the parts are standardized for interchangeability between sizes. For example, you need only two different shafts for all 9 sizes of Fig. 3715 pumps.

We'd like to send you additional details about these chemical pumps. Just drop us a line, asking for Bulletin 725.4. It gives performance curves, sizes and specifications. Or, if you have a pumping problem of any kind one of our representatives will be glad to consult with you about it.



Goulds stainless steel pump handling corn meal mush in a food plant.



This Goulds chemical pump is handling hot fatty acids in an oil processing plant.



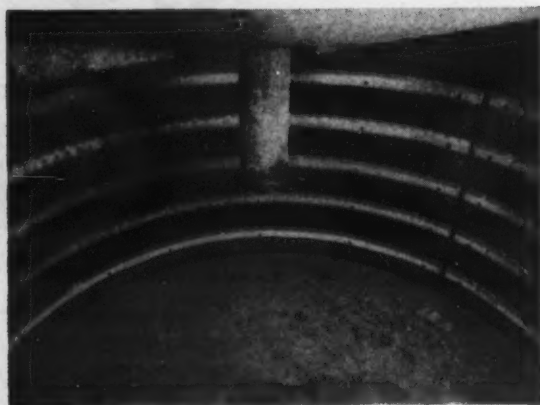
These three Goulds chemical pumps circulate hot size in a textile plant.



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**CONTROLLED RADIANT HEAT FOR  
16 YEARS—NO "DOWN-TIME"**  
...with TRENT "FOLDED-and-FORMED" Heating Units



Interior of asphalt kettle jacket showing heating elements after 16 years continuous operation. Note condition of elements and porcelain supports.

**BARRETT DIVISION, Allied Chemical & Dye Corporation,** reports sixteen years continuous operation of two large asphalt kettles heated by Trent "Folded-and-Formed" Heating Units. Officials at the company's Chicago plant found the heating units still in excellent condition when replacements were made only to meet new voltage requirements! This outstanding record for long radiant heating element life is typical of the standards set by Trent "Folded-and-Formed" heating units in the chemical processing industry.

Trent exposed ribbon type resistor heating elements have proven their advantages wherever high-temperature, controlled radiant heat is essential for efficient processing operations. The unique construction of Trent "Folded-and-Formed" heating elements provide a greater radiating surface per square inch of element cross-section than any other type of electrical heating element... plus—

- LONGER LIFE ● FASTER CONTROL RESPONSE
- NO "DOWN-TIME" ● HIGHER TEMPERATURES
- WELDED INTERNAL CONNECTIONS



Asphalt kettle being removed from jacket for first replacement of heating units in 16 years. New Trent "Folded-and-Formed" units were installed only to meet new voltage requirements.

Let an experienced Trent Heating Engineer show you how you can get better controlled, radiant heat with long-life Trent "Folded-and-Formed" Heating Elements... or ask to see the new Trent "Folded-and-Formed" Heating Element booklet.

Photos courtesy BARRETT DIVISION of Allied Chemical & Dye Corp., Chicago, Ill.



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Write to these addresses for more information on conventions and exhibits listed on page 5 of this issue.

Air Pollution Control Association, 4400 Fifth Avenue, Pittsburgh 13, Pa., Mr. H. C. Ballman, Executive Secretary.

American Institute of Chemical Engineers, 25 W. 45th St., New York, N. Y.

American Management Association, 330 W. 42nd Street, New York 36, N. Y., Mr. Donald G. Keen, Press Relations Manager.

American Oil Chemists' Society, 2100 Robert E. Lee Blvd., New Orleans 19, La., Mr. Carroll L. Hoffpauir, Publicity Chairman (for 42nd Annual Meeting only.)

American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.

Atomic Industrial Forum, Inc., 260 Madison Ave., New York 16, N. Y.

Chemical Market Research Association, c/o Jefferson Chemical Co., 260 Madison Ave., New York 16, N. Y., Robert Henderson.

Conference on Biological Waste Treatment, Manhattan College, 242nd St. & Broadway, New York 71, N. Y., Mr. W. W. Eckenfelder, Assistant Professor.

Instrument Society of America, Exhibit Manager's Office, 3443 S. Hill St., Los Angeles 7, California.

National Air Pollution Symposium, Suite 500, 727 W. 7th St., Los Angeles 17, Calif., A. M. Zarem, Chairman.

National Materials Handling Exposition, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

World Plastics Fair and Trade Exposition, Consolidated Advertising Directors, Inc., 8762 Holloway Drive, Los Angeles 46, California.



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Folding  
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Brighteners  
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Buckets, Clamsh  
Butyl Decyl Ph

Calciners  
APRIL, 1966



## PROCESSES, EQUIPMENT and MATERIALS



Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct . . . or turn to last page and use the handy "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

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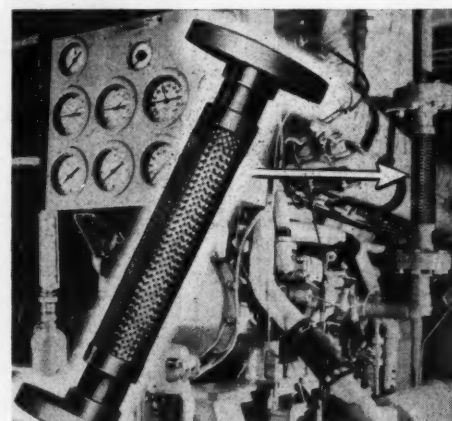
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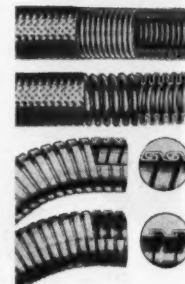
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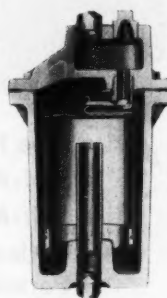
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## The Steam Trap with a Heart of "Gold"...



Bottom inlet—  
top outlet



Side inlet—  
side outlet

Corrosion- and wear-resistant materials; "frictionless" leverage; precision workmanship—add up to **LOW MAINTENANCE.**



Application Engineered

# ARMSTRONG STEAM TRAPS

The exterior of the Armstrong trap pictured above sure looks rough, but inside it has a heart of "gold" for its owner, Chemicals, Inc., Chicago, makers of zinc chloride.

**Fuel Saving**—coal consumption has been cut  $\frac{1}{2}$  carload per month since installing Armstrongs to drain kettle coils.

**Time Saving**—processing time has been cut from 5 days down to 3 days on one zinc chloride tank since installing an Armstrong trap on each of its three coils.

**Maintenance Saving**—occasionally holes are eaten right

through submerged steam coils, allowing acid to get into traps. The stainless Armstrong mechanisms have withstood this abuse successfully. Trap maintenance generally has been negligible. The trap shown above has been on the job working perfectly for five years without repairs.

Take a tip from Mr. Stanley Nykiel, plant operator, who says "I've tried other kinds, but Armstrongs work best." Call your local Armstrong Representative (see classified directory or Thomas Register) or write:

**ARMSTRONG MACHINE WORKS**  
 880 Maple Street • Three Rivers, Michigan

### SEND FOR CATALOG J

The 44-page Steam Trap Book gives complete trap data and prices plus useful selection, installation and maintenance information. Armstrong traps also catalogued in Sweets and Chemical Engineering Catalog.

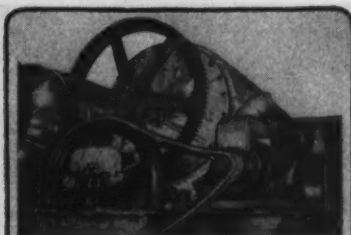


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LIFE 4 TIMES"**

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**REGARDLESS OF THE SIZE AND  
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LUBRIPLATE GREASE AND  
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LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.



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KNOXVILLE 1, TENNESSEE

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Equipment is Heated  
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- Outlasts all others
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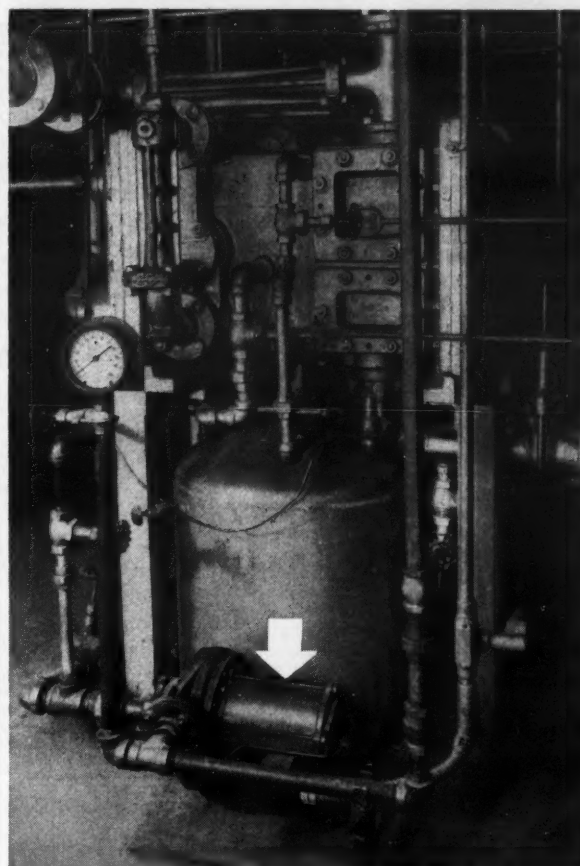
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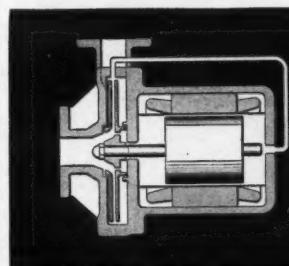
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leakage**

*at  
Bakelite Company*



2 hp Chempump installed on condenser unit at Bound Brook, N. J., plant of Bakelite Company. This is a vacuum system operating at 28 inches of mercury. Pump discharges at 9 psig. Based on outstanding performance of Chempump under extreme vacuum, company is purchasing additional units.



Chempump combines pump and motor in a single hermetic unit. Pumped fluid enters rotor chamber; no shaft sealing device required.

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**Chempump—first in the field...process proved**

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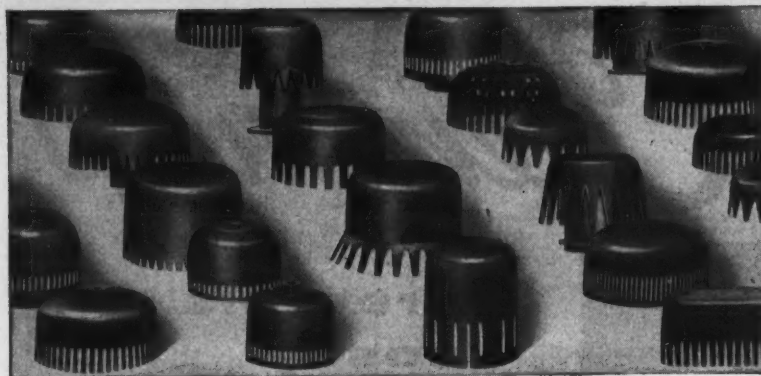
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**Chempump Corp., 1300 E. Mermaid Lane, Phila. 18, Pa.**

**Please send me details on Chempump for:**

(application)  
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Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
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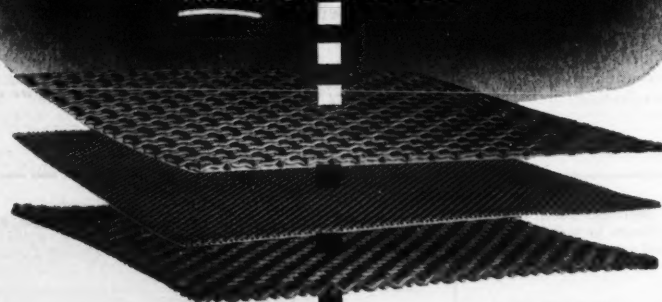
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ARE MADE OF REAL QUALITY MATERIALS

BY MASTER CRAFTSMEN

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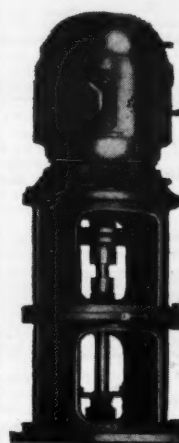


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ing Comp  
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Chemical S  
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tion  
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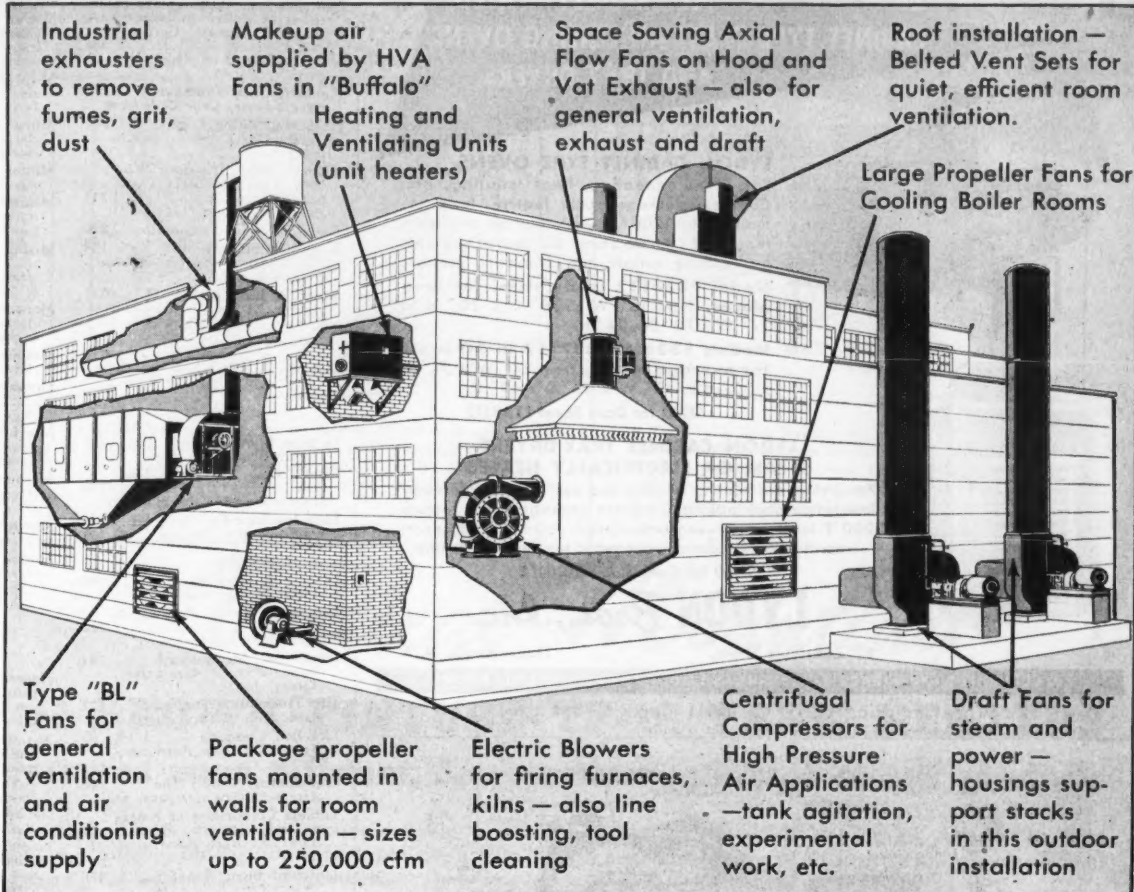
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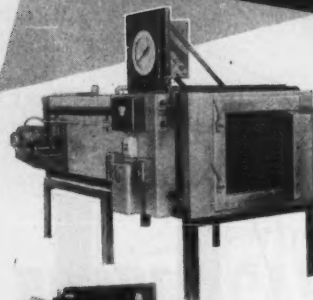
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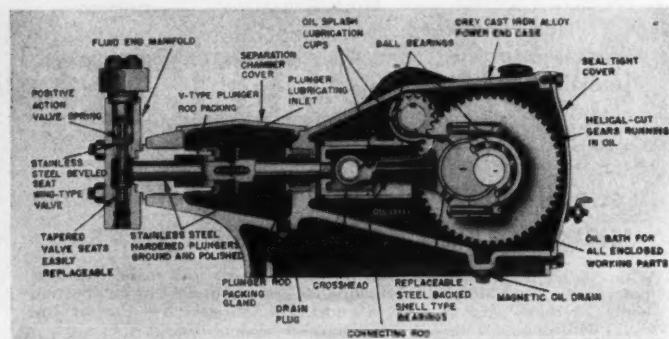
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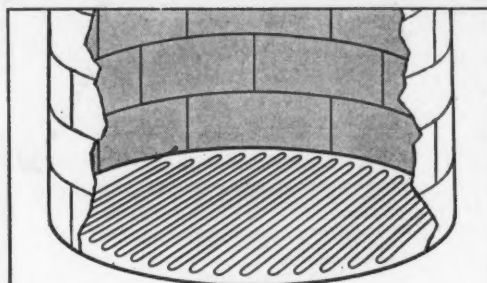
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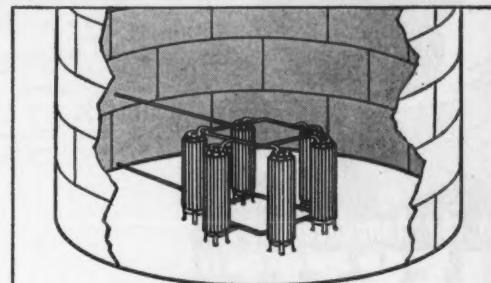
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# BROWN FINTUBE'S

## BETTER DESIGN MEANS BETTER PERFORMANCE



• Old-fashioned coils on the bottom of the tank are expensive to install. The pipes are soon covered over with sediment which seriously restricts the transfer of heat from the pipes to the tank liquid. The tank bottom is cluttered and difficult to clean.



• Our TF-18 Tank Heaters mount vertically. Sediment can not settle on the heat transfer surfaces. Heaters are entirely surrounded by tank liquid, assuring highly efficient heating of stored products year after year. Tank bottom is uncluttered, easy to clean.

## Vertical Mounting

### of BROWN FINTUBE TF-18 TANK HEATERS assures more efficient, less costly heating of stored products

Our TF-18 vertically mounted tank heaters have obsoleted old-fashioned tank coils — and give users four outstanding advantages:—

1) **Lower Cost**—Users report that the cost of our TF-18 Heaters *plus* their installation is usually *less than the cost of just installing* bare pipe coils of equivalent capacity.

2) **Vertical Mounting**—on legs about 10" above the tank floor brings the entire heating surface in contact with the stored product — avoids heating through a layer of sediment.

3) **Increased Heating Efficiency**—the finned construction provides about 7 times more heating surface per foot of lineal length than plain bare pipe. This permits more heat to be transferred — faster — at lower temperatures per square foot

of surface, avoiding coking or damage to heat sensitive products. Mild steel or alloy construction.

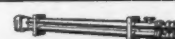
4) **Easy Installation**—TF-18 Heaters pass through a standard manhole permitting easy installation in new or existing tanks. Can be flange connected when desired and thus do not require welding inside the tank. Individually trapped, or manifolded inside or outside the tank.

You can't keep your operations competitive with old-fashioned, obsolete methods. Write today for Bulletin 541. It gives full details, dimensions, etc., about our fully proved, less costly TF-18 Heaters. Tested, and widely used by many of the best known, most progressive, lowest cost companies in the industry. Write for Bul. No. 541 *today!*

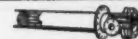


## BROWN FINTUBE CO.

355 HURON ST., Elyria, Ohio



Sectional Heat Exchangers



Tank Suction Heaters



Packaged Heaters



Line Heaters



Tank Heaters

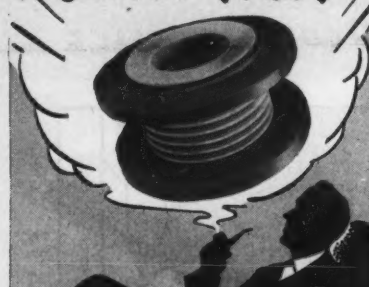


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# A PIPE DREAM Comes True!



with the Announcement of  
**"FLEX-TEF"**

**Flexrock's Expansion Joints  
Made of Solid Teflon\* . . .**

**A BELLOWS PIPE SECTION THAT  
EXPANDS . . CONTRACTS . . ABSORBS SHOCKS AND VIBRATION!**

Fabricated of chemically inert TEFLON\*, these expansion joints are recommended for use against working pressures up to 25 P.S.I. and temperatures from minus 150° F. to plus 400° F.

FLEX-TEF Expansion Joints have outstanding dielectric and non-adhesive properties; all sizes are supplied with gasketed metal flanges drilled to 125 or 150 pound A.S.M.E. standard bolting or for glass piping. Yes, FLEX-TEF is the answer to piping problems.

## A few reasons why:

- One-piece construction
- No danger of cracking or bursting
- Won't contaminate materials conveyed
- Chemically impervious
- Zero water absorption
- Wide temperature range
- Permanent flexibility
- Fits all standard pipe
- Corrects misalignment

**THE PLUS FACTOR** in FLEX-TEF Expansion Joints is to be found in the quality of the product . . . delivered when promised . . . moderately priced.

\*DuPont Trade Mark for Tetrafluoroethylene resin

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Please send Bulletin and Price Sheet on Flexrock's "FLEX-TEF", the new Expansion Joint made of Teflon.

Name .....

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Company .....

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6070	Stainless Steel Tanks	6113b	Chemicals for Soap	6161	Heat Exchanger	6309	Reinforced Plastic Structures	6292i	Plastic Pipe (State Which)
6071	Line Blind Valves	6113c	Amines	6162	Dust Filter	6310	Corrosion-resistant Primer	6292j	Corrosion-resistant Packing
6072a	Roller Mills	6113d	Neo-Fat 8	6163	Pulverizer	6311	Zirconium	6292k	Cast Iron Anodes
6072b	Grinding Mills	6113e	Neo-Fat 10	6164	Nuclear Radiation	6312	Thermocouple Head	6292l	Metal Alloys
6072c	Kilns, Dryers & Coolers	6113f	Neo-Fat 16	6165	Corrosion-resistant Valves	6313	Survey of Corrosion	6292m	Centrifugal Pumps
6072d	Vibrating Screens	6113g	Neo-Fat 280	6166	Electric Motors	6314	Teflon Gaskets	6292n	Polyethylene Bottles and Jars
6072e	Compacting Mills	6113h	Armeen DMS	6167a	"Multi-Layer Manufacturing & Assembling"	6315	Titanium Tubing	6292o	Flexible Labels
6072f	Gyratory Screens	6113i	Armeen DM 18	6167b	"Multi-Layer Engineering for Safety"	6316	PVC Sheet	6292p	Vial Filling Machine
6072g	Man-Lift	6114	Telescriber	6168	Oil Reclaimers	6317	Acid-resisting Lining	6292q	Steel Containers
6073	Ion Exchange	6115	Vinyl Emulsions (State Application)	6169a	Stainless Fittings	6318	Plug-type Valves	6292r	Barrel & Drum Packer
6074	Wire Mesh Sections	6116a	Furfural	6169b	Slide Rule	6319	Corrosion-resistant Coatings	6292s	Check-weight Bag Scale
6075	Steam-jet Ejectors	6116b	Furfuryl Alcohol	6170	Fatty Alcohol Process	6320	Plastic Pipe (State Which)		
6076a	V.R.C. Evaporator	6116c	Tetrahydrofurfuryl Alcohol	6171	Steam Generator	6321	Corrosion-resistant Primer		
6076b	Natural Circulation-type Evaporator	6117a	Microcrystalline Waxes	6172	System	6322	Zirconium		
6077	Dust Collectors	6117b	Synthetic Waxes	6173a	Variable-speed Drives	6323	Corrosion-resistant Packing		
6078	White Water Treatment	6118	Sodium Phosphate	6173b	"Size 6" Variable-speed Drive	6324	Cast Iron Anodes		
6079	"Forging Ahead in Business"	6119	Hydrogenated Tallow Fatty Acids	6174	Vacuum Filter	6325a	Metal Alloys		
6080	Protective Linings	6120	Vermiculite	6175	Aluminum-cleaning Solutions	6325b	Centrifugal Pumps		
6081	Oilless Wood Bearing	6121	Colloidal Silica	6176	Personnel Training	6326	Polyethylene Bottles and Jars		
6082a	Acrolein	6122	Lubricant	6177	Gearmotor-Speed Reducer	6327	Flexible Labels		
6082b	Methacrolein	6123	Polymerized Fatty Acid	6178	Electric Motors	6328	Vial Filling Machine		
6083	Chemicals (State Which)	6124	Iron Oxide Pigments	6179	Flow Meters	6329	Steel Containers		
6084	Solvents (State Which)	6125	Tertiary Amine	6180	Web Edge Controller				
6085	PVA Emulsions	6126	Pressure-sensitive Adhesives	6181	Flow Meters				
6086	Reagent Chemicals in Bulk			6182	Liquid Meters (See Coupon)				
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APRIL, 1951

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6335	Filling Machine	6398	Vibrating Sieves	6453	Steam-jet Ejector	6534	Diffusion and Booster Pumps	6600	Lining for Processing Equipment
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6338	Dust Filter & Collector	6399c	Dissolver-Mill Combination	6456	Asphaltic Coating	6537	Process Equipment Fabrication	6603	Annunciator Systems
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6343	Stencil Ink in Spray Dispenser	6404	Hydraulic Press	6461	Stainless Tubing & Pipe	6540c	Stainless Tube	6608	Solvent Extraction Column
6344	Bag Making Machine	6405	Air Filters	6462	Steam Trap	6541	Fork Trucks	6609	Plate-coils
6345	Bag Packer	6406	Filters & Evaporators	6463	Gear Units	6542	Stainless Steel Pipe	6610	Electrostatic Precipitators
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6364	Rupture Discs	6426	Counter Converter	6488	Lubricated Plug Valves	6562	Impact Mill	6633	Lubricants
6364a	Gas Analyzer	6427	Moisture Register (State Requirement)	6489	Tandem Combustion Units	6563	LP Gas Valves	6634	Porcelain Tower Packings
6364b	Gas Alarm System	6428	Laboratory Baths	6490	Capillary Tube Fitting	6564	Yellow Pigment for Finishes	6635	Rotary Unions
6365	Oxygen Analyzer	6429	Ovens	6491	Blue Asbestos	6565	Stainless Tube & Pipe	6636	Motor Pump Unit (State Application)
6366	Protective Clothing	6430	Pressure & Vacuum Control	6492	Teflon Pump Seal	6566	Twin-shell Blender	6637	Bubble Caps & Risers
6366A	Fire Extinguisher Safety Box	6431	Heavy-duty Mixer	6493	Steam Traps	6567	Isotope-labeled Compounds	6638	Filters & Strainers
6367	Fire Protection	6432a	Blenders	6494	Lubricating and Sealing Compound	6568	Anion Exchange Resin	6639a	Horizontal Pumps
6368	Magnetic Separator	6432b	Grinders	6495	Fluid Power Equipment	6569	Rotary Piston Pump	6639b	Vertical Pumps
6369	Clip-on Safety Glasses	6432c	Ring Roll Mills	6496	Shut-off Valve	6570	Dehydration Unit	6640a	Industrial Fans (State Which)
6370	Fire-resistant Hydraulic Fluid	6432d	Crushing Rolls	6497	Sight Glasses	6571	Drying Equipment	6640b	Ventilating Fan
6371a	Safety Can	6432e	Air Separators	6498	DC Magnet Brakes	6572	Aluminum Finishes	6641a	Annealing Ovens
6371b	Disposal Can	6433	Analog-Digital Converter	6499	Plastic Pump	6573	Water Analysis Equipment	6641b	Tray Dryers
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6371e	Laboratory Safety Equipment	6436	Precious Metal Wire	6502	Contour Retaining Mesh	6576	Industrial Pump	6644	Tank Heater
6371f	Approved Fire Protective Devices	6437	Convection Ovens	6503	Wrap-around Heater	6577	Industrial Coatings	6645	Teflon Expansion Joints
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6373	Chemical-resistant Work Clothes	6439a	Infrared Analytical Control (State Process Problem)	6505	Plug Valves	6579	Insecticide Formulations	6646b	Laboratory Mill
6374	Temperature Indicators	6439b	Infrared Plant Stream Analyzers	6506	Condensate Trap	6580	Adenosine Triphosphate	6646c	Plastics Grinder
6375	Respirator	6440a	Breakers	6507	Electronic Water Treatment	6581	Aluminum Heat Exchanger Tubes	6646d	Ring or Hammer Crusher
6376	Aluminum Ladder	6440b	Crushers	6508	Tube Cleaners	6582a	Power & Processing Equipment (State Which)	6647	Concrete Floor Patch
6377	Plastic Safety Chamber	6440c	Exhausters	6509	Temperature Regulator	6582b	Manufacturing & Maintenance Service (State Requirements)	6648a	Laboratory Mixer
6378	Protective Equipment	6440d	Fiberizers	6510	High-temp Pipe Insulation	6583	Dyeing Solvent	6648b	Top-entering Mixers, Turbines & Paddle-type
6379	Dust Collector	6440e	Granulators	6511	Adhesive	6584	Alkyl Halides	6648c	Top-entering Mixers, Propeller-type
6380	Power Roof Exhausters	6440f	Attrition Mills	6512	Dry & Liquid Feeders	6585	Rare Chemicals	6648d	Side-entering Mixers
6381	Snubber	6440g	Laboratory Mills	6513	Mechanical Seal	6586	Dew Point Indicator	6648e	Mixing Data
6382	Plastic Siphon	6440h	Separators	6514	Jacketed Cross Cleanser	6587	Gaskets, Shims, Washers	6648f	Portable Mixers
6383	Eye Protection Equipment	6441	Texturizers	6515	Steam Traps	6588	Remote Liquid-level Indicators	6648g	Mixing Equipment Line
6384	Dynel Filter Cloth	6442	Dial Thermometer	6516	Vacuum Pumps	6589	Lighting	6648h	Rotary Mechanical Seals
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6386	SO <sub>2</sub> Recovery Process	6444	Electronic Totalizer	6518	Rotary Pumps	6591	Fork Truck Handling	6649b	Phthalic Anhydride
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6390	Mist Eliminator	6448	Laboratory Sinks	6522	Manways & Fittings	6595	Decontamination Safety Suits	6649f	Formaldehyde
6391	Heat Exchangers	6449	Industrial Adhesives (State Application)	6523	Hot Spray Painting	6596	Organic Research Chemicals	6649g	Glycerine
6392	Cyclone Classifiers	6450a	Alloy Steel Pipe	6524	Water Filter			6649h	Maleic Anhydride
6393	Fluid Strainer (State Application)			6525	Plug Valves			6649i	Sodium Sulfite
6394a	Filter Presses			6526	Water Filtering			6649j	Pentachlorophenol
6394b	Filter Media			6527	Pressure-sensitive Adhesive				
6394c	Diaphragm Pumps			6528	Continuous Blowdown System				
				6529	Industrial Fans				
				6530	Temperature Indicator				

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## THAT'S INTERESTING

(Continued from page 2)



### Better arithmetic — by abacus, maybe?

With April 15th just around the corner, and thoughts of internal revenue in mind, we noted this item recently: there were 15% less errors in arithmetic on the 1954 income tax returns, as compared to 1953, according to the man who collects the money. "Increased taxpayer care and accuracy" explains it, he says.

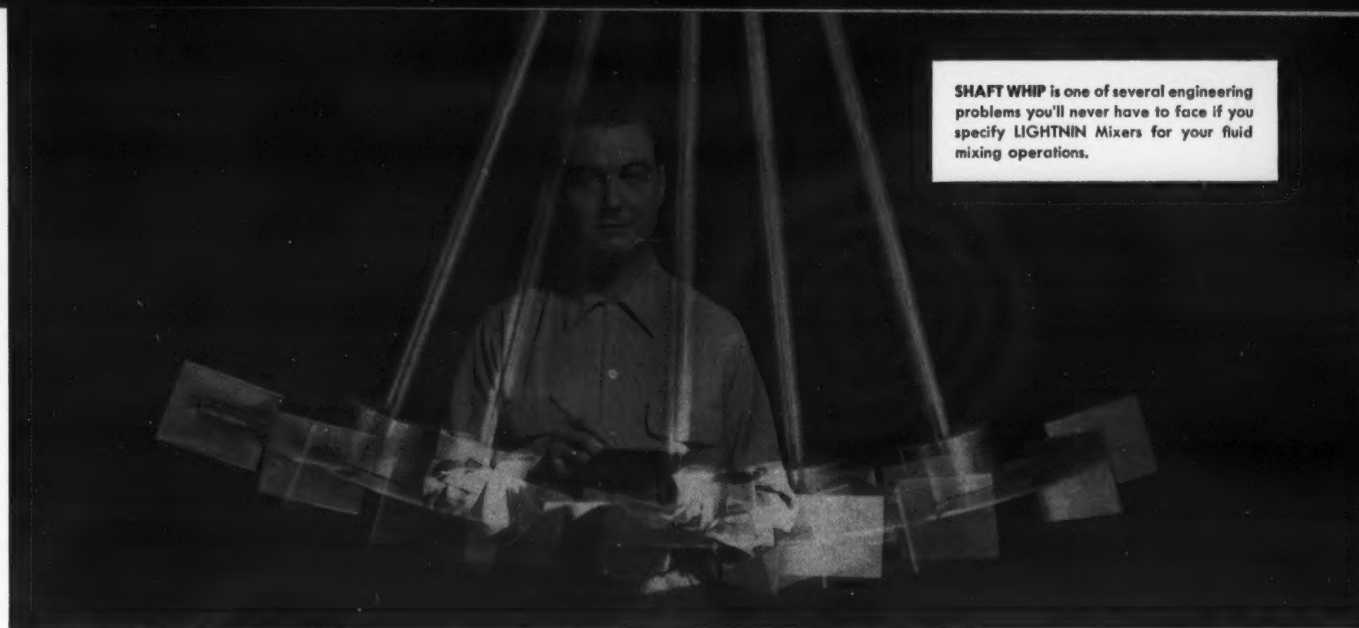
### Light life predictable

Longevity of fluorescent lamps is now predictable almost instantly. General Electric scientists have found that by weighing the chemical, called "emission coating", held by the lamp's cathode, "light life" can be estimated. Other things being equal, life of lamp is proportional to weight of emission coating.

### Here's a switch — for "berth" control

New applications are always popping up for Micro Switches, a product of Minneapolis-Honeywell. One of the latest is "berth" control. No biological significance, however. One of the tiny units sees to it that night light, heater, and fan are shut off when the Pullman porter puts up that berth.

For more information on product at right, specify CP 6648 ... see information request blank opposite last page.



SHAFT WHIP is one of several engineering problems you'll never have to face if you specify LIGHTNIN Mixers for your fluid mixing operations.

## How to control shaft whip when you mix fluids

This is a picture of how *not* to mix fluids.

You know the phenomenon. A three-inch steel shaft, suspended from a rigid mount, is rotating at a speed close to its natural vibration frequency. Without warning, the shaft begins to whip back and forth like a pendulum—farther and farther, faster and faster—until it snaps.

If this happens inside one of your tanks, you're in for a costly repair bill.

It *can't* happen when you mix with LIGHTNIN Mixers.

### How to beat shaft whip

We've tortured hundreds of perfectly good mixer shafts in our lab, just to make sure *you'll* never break one. Our engineers know just how fast a shaft and impeller can rotate, in liquid or in air, without getting too close to the "critical speed." That goes for shafts of any material, any diameter, any length.

How else does this give you better mixing? Well, if you can use a long overhung shaft in a tank, without having to steady it at the bottom, you avoid the upkeep and operating problems of a steady bearing. That can be a big item if you're mixing corrosives or abrasives.

Then, too, if you're using a rotary mechanical seal on a closed tank, you'll want the shaft to run true at all times, to minimize wear on the seal faces.

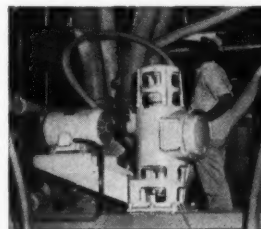
### Here's why you save

We can tell you just how long a shaft, of any diameter, you can use without going to a steady bearing; or conversely, what diameter a shaft of given length should have if you want to keep runout within well-defined safe operating limits.

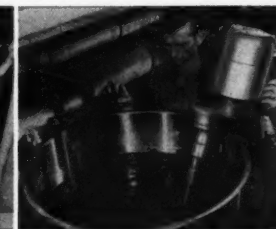
ing limits.

This is just one reason why you save time and cost by mixing with LIGHTNIN. You avoid risk, too. Every LIGHTNIN Mixer is unconditionally guaranteed to do the job for which it is recommended.

Why not find out, today, how easy it is to get the fluid mixing results you want? Just call your LIGHTNIN representative (listed in Chemical Engineering Catalog). Or write us for specific information that will help you.



**HANDLE ALMOST ANY** fluid mixing job with these versatile Series "E" LIGHTNIN Mixers. You can get them in sizes from 1 to 500 HP; for open or closed tanks, top or bottom entering; in hundreds of power-speed combinations.



**MAKE ANY OPEN TANK** an efficient mixing vessel, by adding a LIGHTNIN Portable Mixer. Thousands in use, many for 20 years and more. Thirty models, 1/2 to 3 HP.



**IN LARGE TANKS** (up to 6 million gallons) you can mix, blend, circulate, suspend solids efficiently with LIGHTNIN Side Entering Mixers. No shutdowns are ever necessary to re-pack stuffing box or replace mechanical seal. Sizes 1 to 25 HP.

**Lightnin®  
Mixers**

MIXCO fluid mixing specialists

Get these helpful facts on mixing: cost-cutting ideas on mixer selection; best type of vessel; installation and operating hints; full description of LIGHTNIN Mixers. Free—no obligation. Just check data you want, tear out and mail to us today with your name and company address.

- ☐ DH-50 and DH-51 Laboratory Mixers
- ☐ B-102 Top Entering Mixers (turbine and paddle types)
- ☐ B-103 Top Entering Mixers (propeller types)
- ☐ B-104 Side Entering Mixers

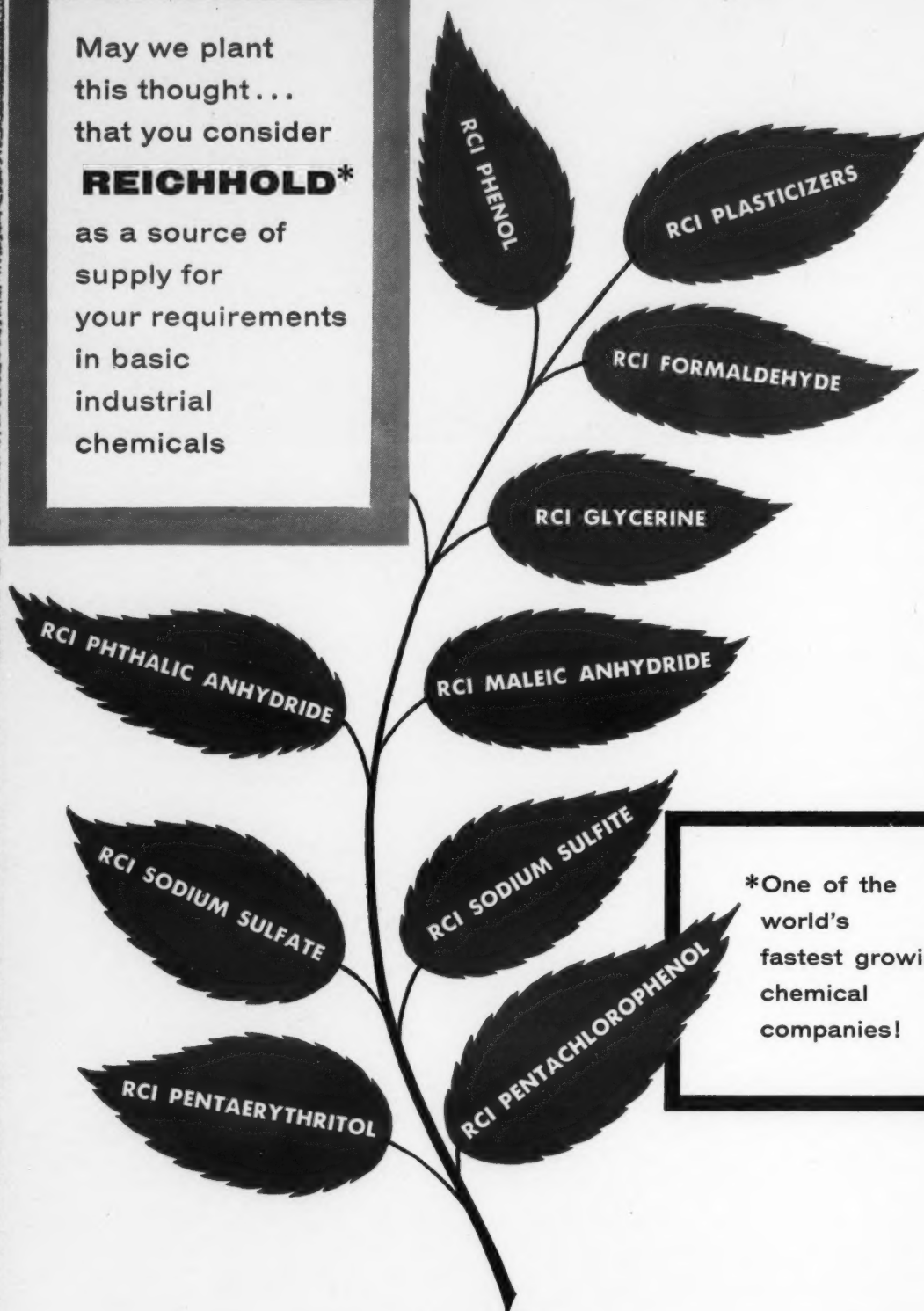
- ☐ B-107 Mixing Data Sheet
- ☐ B-108 Portable Mixers (electric and air driven)
- ☐ B-109 Condensed Catalog (complete line)
- ☐ B-111 LIGHTNIN Rotary Mechanical Seals

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